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J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12 MAY, 1923 No. 4

ENTRIES 2225–2899

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 2343, 2403, 2404, 2412, 2416, 2422, 2436, 2437, 2442, 2494, 2508, 2622, 2674, 2675, 2680, 2687, 2693, 2792, 2793, 2795, 2821, 2822, 2827, 2829, 2831, 2833, 2839, 2842, 2891)

2225. ANONYMOUS. **A novel method of growing potatoes.** Agric. Gaz. New South Wales **33**: 778. *1 fig.* 1922.—Young plants were clipped and transplanted after having been planted some time. One tuber gave a crop of 126 pounds.—*L. R. Waldron.*

2226. ANONYMOUS. **Efwatakala grass (Melinis minutiflora), how it eradicated plantation weeds.** Tropic. Life **18**: 128. 1922.—The article is a quotation from an account in the Rev. Agric. Tropic, San Salvador of a farmer's experience in eradicating Johnson grass, *Holcus halapense,* from his cultivated fields. Finding it almost impossible to destroy the Johnson grass by cultivation he seeded the fields to Efwatakala grass and the latter occupied the ground so fully that the Johnson grass was killed out. He then proceeded to destroy the Efwatakala by cultivation. Eradication of this grass was easy on account of its fibrous root system. This method of eradicating persistent weeds would appear of considerable value in tropical and sub-tropical regions. Note: The grass *Melinis minutiflora* is known as "Molasses grass" in the United States and as "Gordura grass" in Brazil where it is abundant. [See also Bot. Absts. 11, Entry 3298.]—*H. N. Vinall.*

2227. ANONYMOUS. **Field experiments with peanuts. Grafton and Wollongbar experiment farms, 1921–22.** Agric. Gaz. New South Wales **33**: 793-794. 1922.—Peanut varieties used were Chinese, White Spanish, and Valencia. Planting was done late in September and the crop was harvested in March and April. The maximum yield of 2,165 pounds of nuts per acre was secured from White Spanish at Wollongbar. There is very little local demand for the crop.—*L. R. Waldron.*

2228. ANONYMOUS. **Kieselsäure als Phosphorsäureersatz. [Silicic acid as a substitute for phosphoric acid.]** [Rev. of: LEMMERMANN, OTTO. **Die ertragsteigernde Wirkung der Kieselsäure bei unzureichender Phosphorsäuredüngung. [Effect of silicic acid in increasing yields in deficient phosphate fertilization.]** Sonderabdruck a. d. Zeitschr. Pflanzenernähr. u. Düng. *8 vo, 72 p.* 1922.] Wiener Landw. Zeitg. **72**: 395-396. 1922 [1923].—Silicon in certain forms appears to be directly utilized by the plant, and an increase of yield is noted particularly

when the fertilizer is somewhat deficient in phosphoric acid but potash and nitrogen are supplied in the requisite quantities. The most favorable form of silicon was colloidal silicic acid; phonolith was without action and kieselguhr was injurious. The investigation was carried on in quartz sand and soil cultures, and the results confirmed in the field. The action of silicic acid fertilizer is held to be directly on the plant, as opposed to the conclusion first arrived at at Rothamsted that phosphates are thereby only rendered more readily assimilable. The importance of these findings, in view of the shortage of phosphates in central Europe, is emphasized.—*F. Weiss.*

2229. Anonymous. **Verslag over het jaar 1921.** [Report for the year 1921.] Dept. Landb. Suriname *94 p.* Paramaribo, 1922.—At the experiment station 297 hectares were planted in coffee. The growth of the plants was generally good, and the seed beds furnished sufficient material. A part of the land was at first planted with bacove as shade, later followed by coffee. The cocopalm plantation suffered considerably from heart rot. The breeding of coffee and cocoa is of much importance, and large numbers of budded and grafted plants are available. Fermentation of coffee bean shows some difficulties: instead of being complete in 4 days, the process is sometimes not concluded in 6 days or even more. By the addition of sour milk, however, fermentation may be finished in 1–3 days, and this new process is followed by several plantation owners.—Further short reports are given on malachra, okra, *Hibiscus cannabinus*, *H. sabdariffa*, rice, corn, bananas, citrus fruits, and forestry activities.—*J. C. Th. Uphof.*

2230. Arny, A. C. **Border effect and ways of avoiding it.** Jour. Amer. Soc. Agron. **14:** 266–278. 1922.—Experiments show that the removal of border rows is necessary in order to secure reliable results. However, under certain conditions this operation may not be necessary. Careful experimentation over a period of years is the only way to determine this point. —*F. M. Schertz.*

2231. Batten, E. T. **Experiments with cotton and peanuts.** Virginia Agric. Exp. Sta. Bull. 229. *22 p., 5 fig.* 1922.—The 8 years' experiments were conducted at Holland, Virginia. Lime was found to be beneficial and should be applied to all soils in the locality once in 4 years. Fertilizer should not be applied directly to peanuts except on the poorer soils where acid phosphate and cottonseed meal, or other organic source of nitrogen, are recommended. Cotton should receive nitrogen, phosphorous, and potash, especially the latter. Nitrogen should be used sparingly on the richer soils and must be balanced with phosphorous to insure early maturity. A complete fertilizer, analyzing 4–8–2, is profitable for the corn crop. Soy beans should be included in the rotation, either as a separate crop or planted in the corn.—*F. D. Fromme.*

2232. Bauer, Franz. **Ueber Kunstdüngung.** [Use of artificial fertilizers.] Wiener Landw. Zeitg. **72:** 78–79. *1 fig.* 1922.—Practically all of Austria's needs for artificial fertilizers, must be met by importation. Owing to the high price of imported fertilizer, and to prevent the sale of worthless products, the manufacture of a mixed fertilizer has been undertaken under state auspices. A diagram showing the artificial fertilizers which may or may not be mixed before application, and recommendations for rates of application are given.—*F. Weiss.*

2233. Beaven, E. S. **Trials of new varieties of cereals. Part II.** Jour. Ministry Agric. Great Britain **29:** 436–444. 1922.—A description is given of the "half-drill-strip" method of sowing cereals designed to reduce the probable error of the results of trials of new races.—*M. B. McKay.*

2234. Bidwell, George L., Leslie E. Bopst, and John D. Bowling. **A physical and chemical study of milo and feterita kernels.** U. S. Dept. Agric., Bull. 1129. *8 p.* 1922.—On the whole, kafir, milo, and feterita resemble one another in composition and appearance. Aside from their food value for man and domestic animals, they may possibly be used com-

mercially in the manufacture of starch, sirup, alcohol, and oil, when proper machinery and processes have been devised, but probably not for malting purposes.—*J. T. Buchholz.*

2235. Blair, A. W. **Agricultural and commercial values of nitrogenous plant foods.** Jour. Amer. Soc. Agron. **14**: 162–167. 1922.—No greater returns have been received from the use of organic forms of nitrogen than from inorganic forms, and it has cost the farmer more. The ready availability of nitrate has had much to do with the larger yields where nitrate was used. The commercial values of organic materials should be made more in accordance with their agricultural values.—*F. M. Schertz.*

2236. Blakely, W. F. **Weeds of New South Wales.** Agric. Gaz. New South Wales **33**: 815–817. *1 fig.* 1922.—Tumbling mustard (*Sisymbrium altissimum*) was first collected at Cudal in 1920. The plant is figured and described, and methods of control are suggested.—*L. R. Waldron.*

2237. Brown, B. A. **Plot competition with potatoes.** Jour. Amer. Soc. Agron. **14**: 257–258. 1922.—Experiments show that apparently yields of potatoes are not influenced by competition between single-row plots.—*F. M. Schertz.*

2238. Brown, B. E. **Effect of borax in fertilizer on the growth and yield of potatoes.** U. S. Dept. Agric. Bull. 998. *8. p.* 1922.—Results of these experiments, conducted on Caribou loam, Aroostook County, Maine, showed that definite injury occurred with an application as low as 5 pounds of borax per acre when the borax was put in the furrows and the planting done immediately. Some of the reactions with borax were: failure of the seed piece to germinate; killing of sprouts; absence of roots on seed pieces; general weakness of plants which come through the ground; bleaching of the foliage; poor stand and low yields.—*J. T. Buchholz.*

2239. Chalons. **Beiträge zur Sorteneinteilung von Weizen und Roggen unter besonderer Berücksichtigung der Halmanordnungen. [Contribution to the variety separation of wheat and rye, with special reference to blade arrangement.]** Landw. Jahrb. **57**: 667–677. 1922.—On analyzing varieties of winter and summer wheats and rye, the author demonstrated that the thickness of the spikelet is subject to great variations within the individual plants and therefore can not be used as a basis of variety differentiation, as suggested by Moebins and Derlitzki. The size and arrangements of blades, however, are of importance, especially between the main blade and that of the second order.—*S. A. Waksman.*

2240. Chambliss, Chas, E., and J. Mitchell Jenkins. **Some new varieties of rice.** U. S. Dept. Agric. Bull. 1127. *17 p., 4 pl.* 1923.—"This bulletin includes a description of the rice plant, and a botanical and agronomic description of 7 new varieties that have been developed in the course of cooperative experiments at the Rice Experiment Station, Crowley, Louisiana, and of 4 varieties now widely grown in this country. The agronomic performance and adaptation of each variety, including a full description of the conditions under which the experiments were conducted, are discussed in detail. The commercial value of the milled rice of the new varieties from a culinary standpoint is indicated."—*J. T. Buchholz.*

2241. Collins, S. H., and B. Thomas. **The sugars and albuminoids of oat straw.** Jour. Agric. Sci. **12**: 280–286. 1922.—"Fine weather" during harvesting is essential for obtaining high percentages of sugar which gradually disappears from straw after harvest. The loss is very rapid if straw becomes damp. The amount of albuminoids in oat straw is largely conditioned by the amount of nitrogen in the soil, but the amount of grain produced is also a factor. By proper management, oat straw of much higher feeding value can be obtained.—*V. H. Young.*

2242. Conner, S. D. **Nitrogen in relation to crop production in the middle west.** Jour. Amer. Soc. Agron. **14**: 179–182. 1922.—The nitrogen problem is the most important soil

fertility problem before the corn belt farmers. Average Indiana soils have lost 20–40 pounds of nitrogen per acre per year for the last half century. Legumes and manure are needed. Much of the profit in the use of lime, phosphate, and potash is in the beneficial effect on legumes.—*F. M. Schertz.*

2243. Davidson, J. D., and R. G. Stapledon. **Failure of Black Yeo oats in Glamorgan in 1921.** Jour. Ministry Agric. Great Britain **29**: 465–469. 1922.—On 10 farms spring-sown Black Yeo oats, with seed from the same source, failed in spite of the fact that the seed was quite normal in appearance, gave no evidence of defect, and on test had germinated 97 per cent. The failure was due in part to unfavorable climatic conditions and to the fact that the variety is a winter variety; but chiefly because the seed were defective in some physiological respect which rendered them particularly susceptible to the influence of drought. This defect was strikingly revealed by a differential germination test conducted in soil in pots in which normal, half, quarter, and double waterings were used. The results secured indicate that differential germination "tests conducted under conditions less favorable to germination and growth than ordinary conditions are competent to reveal defects in a sample that might be overlooked if only the ordinary test was conducted and to bring out such defects more prominently."—*M. B. McKay.*

2244. Davidson, Jehiel. **The effect of nitrates applied at different stages of growth on the yield, composition and quality of wheat.** Jour. Amer. Soc. Agron. **14**: 118–122. 1922.—The effectiveness of nitrates in increasing yields consistently decreases as the time of application approaches the stage of heading. The effectiveness of nitrates in increasing the protein content (N × 5.7) of the grain increases as their effectiveness in increasing the yield decreases.—*F. M. Schertz.*

2245. Ellett, W. B., and T. K. Wolfe. **The effect of fertilizers on yield and market conditions of corn.** Jour. Amer. Soc. Agron. **14**: 153–158. 1922.—Under the experimental conditions it appeared that phosphates and stable manures are the most valuable materials used for increasing the yield and quality of the corn crop. Organic matter in the form of green manure, as well as in the form of stable manure, has been valuable in increasing yield.—*F. M. Schertz.*

2246. Fenton, E. W. **Spotted medick.** Jour. Ministry Agric. Great Britain **29**: 643–648. *2 fig.* 1922.—Spotted medick (*Medicago arabica* All.; *M. maculata* Sibth.), a troublesome weed in meadow and pasture lands, has apparently been recently introduced into certain areas in wool, shoddy, and wool cleanings. It may be eradicated by dusting—preferably in early spring—with sulphate of ammonia at the rate of 5–12 ounces of the dust to 8 square yards of ground surface.—*M. B. McKay.*

2247. Garver, Samuel. **Alfalfa root studies.** U. S. Dept. Agric. Bull. 1087. *28 p., 19 fig.* 1922.—Studies were made at Redfield, South Dakota, on 7 varieties of alfalfa seeded at the same time and grown under the same soil moisture conditions. The root systems of the least hardy forms of purple-flowered alfalfa may be distinguished from the most hardy hybrid and yellow-flowered alfalfas with accuracy. The intermediate forms, however, are not sufficiently distinct to be distinguishable from one another or invariably from some forms of the non-hardy or of the yellow-flowered alfalfas. Factors tending to produce modification of tap roots in alfalfa are soil, climate, cultural treatment, and injuries.—*J. T. Buchholz.*

2248. Gericke, W. F. **Studies on the effect of nitrogen applied to oats at different periods of growth.** Jour. Amer. Soc. Agron. **14**: 312–320. 1922.—The paper reports the effect of N applied to oats at different periods of growth, on time of maturing of the plants, on the height and number of stalks produced, on production of dry matter, and on the protein content of the grain.—*F. M. Schertz.*

2249. Graeber, L. F. **Scarification as it affects longevity of alfalfa seed.** Jour. Amer. Soc. Agron. **14**: 298–302. 1922.—The data indicate clearly that scarification exposes alfalfa seed to factors which cause a far more rapid decrease in viability than normally obtains with the untreated seed. To obtain best results, seed should be scarified shortly before seeding.—*F. M. Schertz.*

2250. Haskell, S. B. **A study of present and future supplies of fertilizer nitrogen.** Jour. Amer. Soc. Agron. **14**: 167–178. 1922.—A general review of the nitrogen situation is presented.—*F. M. Schertz.*

2251. Hayes, H. K., and A. N. Wilcox. **The physiological value of smooth-awned barleys.** Jour. Amer. Soc. Agron. **14**: 113–118. 1922.—Comparative yield tests and comparative studies in transpiration of heads of smooth- and rough-awned varieties indicate that smooth-awned barleys are under no physiological disadvantage when compared with standard rough-awned varieties.—*F. M. Schertz.*

2252. Jensen, O. F. and M. E. Olson. **A small grain nursery thresher.** Jour. Amer. Soc. Agron. **14**: 110–112. 1922.—A small grain thresher is described which the authors find convenient in threshing yard-square plots and also rod or head rows. Three men threshed and cleaned 120 samples per hour, recording weights of both straw and grain. A detailed description of the machine is given together with drawings.—*Roland McKee.*

2253. Kemp, W. B. **An index for measuring the performance of wheat varieties and strains.** Jour. Amer. Soc. Agron. **14**: 258–265. 1922.—The index is an aid to measuring the progress that has been made in variety testing and selection or breeding of wheat and other small grains.—*F. M. Schertz.*

2254. Kerle, W. D. **The Clarence River maize growing contest.** Agric. Gaz. New South Wales **33**: 779–782. 1922.—Nine farmers competed, the crops being grown in each case under comparable conditions upon 2 farms. The plots securing 1st prize were planted to a local variety and gave an average yield of 94 bushels per acre.—*L. R. Waldron.*

2255. Kniertem, W. von. **Düngungsversuche mit verschiedenen neueren Stickstoffdüngemitteln.** [**Fertilizer experiments with various new nitrogenous fertilizers.**] Mitteil. Deutsch. Landw. Ges. **37**: 654–655. 1922.—The writer reports the results of a test with urea, ammonium sulphate, and ammonium sulphate-nitrate on potatoes and beets. All plots received equal amounts of nitrogen in the above mentioned forms. The plot receiving urea gave the highest yield. Similar results were secured with sugar beets. In view of the high nitrogen content of urea (46 per cent) its use is advised since small quantities cover considerable areas.—*A. J. Pieters.*

2256. Lambourne, J. **Local production of gingelly as a catch crop.** Malayan Agric. Jour. **10**: 94–99. 1922.—It is shown that *Sesamum indicum* can be grown as a crop in the Malay Peninsula. The seed sown was of mixed races, which reduces the value of the experiment; it is not even clear that early races only were in the crop, though early races were present as the period from sowing to harvesting was 109 days. The constants of the oil obtained are given.—*I. H. Burkill.*

2257. Ling, Arthur R. **Sugar technology.** [Rev. of: (1) Deerr, Noël. **Cane sugar: A text book on the agriculture of the sugar cane. The manufacture of cane sugar and the analysis of sugar house products.** *2nd ed., rev. and enlarged, viii + 644 p., 29 pl.* Norman Rodger: London, 1921. (2) Jones, Llewellyn, and Frederic I. Scard. **The manufacture of cane sugar.** *2nd ed., xix + 481 p., 270 pl.* Duckworth & Co.: London, 1921. (3) Murke, F. **Condensed description of the manufacture of beet sugar.** *v + 175 p.* John Wiley and Sons: New York; Chapman and Hall: London. 1921.] Nature **110**: 4–5. 1922.—The reviewer

regards the first 2 books as comprehensive and authoritative. The 3rd is intended for factory superintendents, etc., and scarcely desirable as an elementary textbook on the subject.—*O. A. Stevens.*

2258. Lipschütz, H. **Versuchsergebnisse mit Phosphathumus und Stickstoffhumus.** [Experiments with phosphorus- and nitrogen-containing humus.] Wiener Landw. Zeitg. 72: 19–21. 1921.—The use of these fertilizers is claimed to have given greater yields of potatoes, mangels, and wheat, even in an abnormally dry year like 1921, than were obtainable by the use of mineral fertilizers alone. The particular value of these humus fertilizers is ascribed to the contained organic matter and soil-modifying bacteria.—*F. Weiss.*

2259. McCool, M. M., and Paul M. Harmer. **Effect of fertilization on the growth of sugar beets on some Michigan muck soils.** Jour. Amer. Soc. Agron. 14: 228–234. 1922.—A study is reported on the effect of fertilizers on tonnage, sugar content, and percent of purity of beets.—*F. M. Schertz.*

2260. Makin, R. N. **Farmers' experiment plots. Maize experiments, 1921–22. South coast.** Agric. Gaz. New South Wales 33: 790–792. 1922.—Trials for grain yields were conducted on 5 private farms. The maximum yield, 150 bushels per acre, was secured from Funk's yellow dent corn. Superphosphate gave best results in manurial trials.—*L. R. Waldron.*

2261. Martin, John H. **Experiments with cereals on the Belle Fourche Experiment Farm Newell, South Dakota.** U. S. Dept. Agric. Bull. 1039. *72 p., 22 fig.* 1922.—Experiments conducted on dry land for 12, and on irrigated land for 8, years are reported. The soil is a heavy, impervious clay known as Pierre clay. The seasonal precipitation is an important factor influencing the yield of grain. The best varieties of wheat, oats, and barley have yielded fairly well on dry land, but with complete or partial failure in some years. Varieties recommended for growing on dry land are: spring wheat,—Kubanka, Marquis; winter wheat,—Turkey, Kharkof; oats,—Kherson, Sixty-Day; barley,—White Smyrna, Hannchen. Winter wheat has produced higher average yields than spring wheat, but is uncertain due to winter-killing and soil blowing. The Kubanka is the highest yielding spring variety. On irrigated land the same wheat varieties are recommended. Winter wheat gives a slightly higher average yield than spring wheat. Other varieties recommended for irrigated land are: oats,—Silvermine, White Russian; barley,—Chevalier, Trebi; flax,—Damont, Reserve. Rate of seeding experiments are also reported, and recommendations made for the several varieties.—*J. Lincoln Cartledge.*

2262. Müller, H. C., und E. Molz. **Versuche zur Erhöhung der Produktionskraft der Saatkartoffel.** [Experiments on the increase of productivity of seed potatoes.] Landw. Jahrb. 57: 679–706. 1922.—Seed potatoes harvested when the vines were still green were distinguished by uniform germination, earlier growth, and larger yields in comparison with those harvested when the vines had died down. Plants injured in early development gave tubers with weakened productivity. Moderate shading produced results similar to early harvesting, the tubers being more productive than from plants grown in the light. Good light also increased the setting of tubers, while insufficient light diminished it and brought about more abundant leaf growth. Light and transpiration relations of the plant, which modify the starch content of the tubers, have an important influence upon the productivity of the seed potato. Also size of the seed potato, other things being equal, influences the yield.—*S. A. Waksman.*

2263. O'Dwyer, Margaret H. **Preliminary report on the nutritive value of certain Australian grasses.** Proc. Linn. Soc. New South Wales 46: 239–251. 1921.—Material was taken and air dried at (a) medium stage, halfway between beginning of shoot and flowering; (b) at early flowering; (c) when seed was quite set. Material was weighed at the farm as soon

as cut; this is responsible for certain inaccuracies due to lack of equipment. Rapid changes of material, especially those produced by wilting, are discussed. For analysis samples were ground fine enough to pass a 1 mm. sieve and stored in air tight bottles in the dark. The methods of the Association of Official [American] Agricultural Chemists (1919) were followed in the main. The effect of soil, season,and elevation was noted. Table 1 presents analyses of 3 specimens of *Danthonia semiannularis* Labill., 5 of *Schedonorus Hookerianus* Benth., and 2 of *Panicum prolutum* from different localities and soils. It also gives stage of growth, moisture content, ash, crude protein, true protein, crude fiber, ether extract, pentosans, carbohydrates, and albuminoid ratio. Table 2 shows the protein content at different stages of growth in 7 specimens of *Schedonorus Hookerianus*, 1 of *Panicum decompositum* R. Br., 4 of *P. prolutum*, 2 of *Eragrostis leptostachya*, 3 of *Danthonia semiannularis*, 1 of *D. pilosa* (?) R. Br., and 1 of *Pollinia fulva* Benth. Table 3 gives the protein content in the flowers of these species.—*Eloise Gerry.*

2264. Paerels, J. J. **Coirvezel.** [Coconut fiber.] Cultura 34: 305-308. 1922.—After the settlement of the Hollanders in the Malayan Archipelago, the coconut fiber industry increased slightly until 1851, when, during the London exhibition, this product became better known. In Java, natives beat a section of the coat of the fruit until it becomes soft. This mass of fiber is soaked in water for 12 hours to loosen the "latek" or solid matter between the fibers and epidermis. After further beating the shortest fibers are removed by hand, then the entire mass is wrung. The fiber is dried in the sun, rolled by hand on a board, and later sorted into 2 types, both suitable for the production of rope. In Ceylon, on the other hand, a fermentation process is generally followed.—*J. C. Th. Uphof.*

2265. Paerels, J. J. **Vezel agave.** [Fiber agave.] Cultura 74: 381-387. 1922.—The growing of agave for fiber is being developed in Dutch East India. *Agave sisalina*, *A. cantala*, and *A. fourcroydes* are cultivated. Harvesting in Java begins 3-4 years after the 2-year old plants have been planted. The older leaves are better for fiber production. Vertical leaves are not harvested, but those growing at an angle of 45° or more are cut. The dry period is the best for harvesting. In Java 3-4 cuttings are made a year, about 30 leaves to the plant are gathered, and 1000-1250 kgm., sometimes 2000, of fiber per bouw [0.70 hectare] are harvested.—*J. C. Th. Uphof.*

2266. Pawlik, R. **Ueber die Setzweite der Kartoffeln.** [Concerning the planting distance for potatoes.] Wiener Landw. Zeitg. 72: 97. 1922.—Potatoes spaced about 20-30 cm. apart gave higher yields than those more closely or distantly planted. This requires about 20 bushels of seed per hectare.—*F. Weiss.*

2267. Robertson, G. S. **Field experiments with rock phosphates and basic slags.** Jour. Ministry Agric. Great Britain 29: 519-530, 600-605. *10 fig.* 1922.—"Rock phosphates produce exactly the same type of improvement in the quality of the hay crop and the pasture as the most soluble types of open hearth basic slag, and they are quite as effective in this respect. The open hearth low-soluble fluorspar slags are not so consistent in their behavior. The evidence suggests that the less soluble types do not improve the hay crops to the same extent as the high-soluble slags."—*M. B. McKay.*

2268. Rossem, C. van. **De nauwkeurigheid van bemestingsproeven bij rijst, alsmede overzicht van de uitkomsten van de bemestingsproeven met stickstof- en phosphorzuurhoudende kunstmest, genomen in de jaren 1911-1917.** [The accuracy of fertilizer tests with rice, with a survey of the results of fertilizer tests with artificial fertilizers containing nitrogen and phosphoric acid.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Alg. Proefsta. Landb. Mededeel. 4. *33 p.* 1920.—Errors due to soil variation are classed as systematic. If all observations are of equal accuracy, the arithmetic mean is the most probable value. Because the mean error decreases slowly with increasing numbers of observations, it is more economical to increase reliability by refining methods than by increasing the number of observations.

The mean error is a measure of the accuracy of a result, but not of its correctness. The latter depends also on the presence or absence of systematic errors. Deviations more than 3 times the mean error indicate systematic factors. Differences in experiments are considered significant if 3 times their mean error (4.5 times their probable error). In a test with 10 replications a difference must be as great as 6 pikols wet padi, and with 5 replications 8 pikols per bouw in order to be significant [1 pikol wet padi per bouw = 78 pounds per acre, or about 39 pounds milled rice per acre]. The mean error is independent of the mean yield. These conclusions are based upon 4 years' tests. In only 2 cases has potassium deficiency been demonstrated, and in these additions of potassium did not pay. The number of cases found of soils deficient in nitrogen equalled the number deficient in phosphorus, but the addition of double superphosphate to soils poor in phosphorus gave greater increases than the addition of equal quantities of ammonium sulphate or ammonium chloride to soils poor in nitrogen. In the district of Rembang an increased yield of 32 pikols per bouw resulted from adding 1 pikol of double phosphate per bouw.—*Carl Hartley.*

2269. Ruzicka, Charles H. **Williston substation report 1914–1920.** North Dakota Agric. Exp. Sta. Bull. 158. *104 p., 17 fig.* 1922.—The results presented in many cases cover a period of 13 years. It is not evident that durum wheats have been significantly more resistant to drought and heat damage than the leading wheats of other groups.—In a rate-of-seeding test made with common wheat and extending over 8 years, yields from 4-, 5- to 6-peck rates were nearly identical.—A date-of-seeding trial was conducted with wheat for 4 years. Seeding was done April 15, May 1, and May 16. The average yields were 34.4, 29.7, and 20.2 bushels per acre, from early seeding to late seeding, respectively. —Phenological notes and weight per bushel are given on different groups of wheat.—Experiments do not warrant planting winter wheat except possibly in special cases.—Experiments were conducted with varieties of oats, barley, flax, and rye. In comparative yields secured from emmer, barley, and oats for a period of years, emmer has yielded 1728, barley 1875, and oats 2045 pounds per acre.—Both proso and millet occasionally have given excellent yields of seed.—Results with buckwheat have generally been negative.—In a 7-year trial of corn varieties, Dakota White Flint ranked 1st with 26.4 bushels, Gehu 2nd with 25.2 bushels, and Northwestern Dent 3rd with 23.2 bushels per acre.—The bulletin deals with manner, rate, and time of planting and cutting corn and previous treatment of the soil.—Following an ear-row and seed corn plot method for 5 years, yield was only slightly affected but the quality improvement was significant.—Certain varieties of sorgo gave good averages of fodder, but their inferior feed quality makes them an unimportant substitute for corn.—Sudan grass for an average of 6 years yielded 3351 pounds of air-cured hay per acre when sown in drills for cultivation.—Yields from sunflowers grown under dry land conditions were essentially the same as yields secured from corn similarly grown. In a trial of 1 season, sunflowers (irrigated) outyielded corn (irrigated) by 3 tons of green material per acre.—Forage crops from different kinds of millets have been successful only in certain years.—For the 3 years, 1915–1917, brome grass yielded 1528 pounds per acre and slender wheat grass 1253.—Timothy, red clover, and vetch have not been successful.—Results are discussed of extensive rotation experiments with small grains and corn.—Wheat on fall-plowed land plowed 8 inches deep and deep-tilled to a depth of 16–18 inches every 4th year showed only a slightly greater yield than when grown after plowing of medium depth.—It is possible to store in well handled fallow land only from $\frac{1}{5}$ to $\frac{1}{3}$ of the season's precipitation to be available for the succeeding crop. Disking stubble land in the fall after the binder has not shown increased yields over comparison plots treated in the ordinary way. Cultivation to maintain a mulch has evidently had but little effect aside from killing weeds.—Experiments with potatoes have covered a comparison of varieties, size and method of cutting seed tubers, rates and methods of planting, methods of soil treatment, and methods of field selection.—Notes are given on trees and shrubs and certain kinds are recommended. Notes are given on various fruits including crabapples, plums, and bush fruits.—*L. R. Waldron.*

2270. Schubert. **Eine bewährte Kartoffelsorte. [A potato variety of proved value.]** Wiener Landw. Zeitg. 72: 96. 1922.—The variety Alma has been a consistent leader during 3 years of variety testing at several stations in Tyrol, outyielding in particular the newly introduced English potatoes.—*F. Weiss.*

2271. Schubert, Josef S. **Etwas über Sortenwahl und Sortenwechsel im Kartoffelbau. [Concerning selection of potato varieties.]** Oesterreich. Zeitschr. Kartoffelbau 2: 1–3. 1922.—The author discusses the distribution of potato culture in Austria from the standpoint of soil types, yield, and varieties grown. He classifies varieties with respect to resistance to blight, scab, and wart diseases.—*F. Weiss.*

2272. Schuster, George L. **Influence of fertilizers on yield and maturity of soy beans.** Jour. Amer. Soc. Agron. 14: 193–197. 1922.—It is the muriate of potash in fertilizers that brings the soy beans to maturity. Manure (3–5 tons per acre) favored early maturity—probably due to the potash contained—and gave the largest yields. In the absence of manure 250 pounds of acid phosphate and 75 of muriate of potash are recommended. Nitrate of soda gives unsatisfactory results with soy beans as to maturity, yield, and financial returns.—*F. M. Schertz.*

2273. Sherwin, M. E., R. B. Etheridge, and A. Dunham. **A new muck soil problem and its solution.** Jour. Amer. Soc., Agron. 14: 212–215. 1922.—The authors discuss a muck soil problem in North Carolina.—*F. M. Schertz.*

2274. Snellen, E. **Over het groot-Rijstbedrijf in Ned-Indie. [Large-scale rice culture in Dutch India.]** West Indië 7: 71–79. 1922.—The fact that the region requires more rice than it produces has led to experiments with rice culture on a large scale as is done in California. In Surinam, fields were laid off to make possible irrigation and drainage. The experiments though not very successful are being continued. The author reviews an address by van der Veer before the Netherlands-India Association for Industry and Agriculture in the Hague, in which the speaker discussed the possible use of tractors, etc., in the rice fields. The difficulties and the special requirements of machines for successful operation are pointed out. —*A. J. Pieters.*

2275. Sparks, G. C. **Some phases of wheat culture.** Agric. Gaz. New South Wales 33: 775–777. 1922.—A method of mass selection is suggested to be used on the farm. Care is urged to avoid seed injury when treating with formalin and copper sulphate.—*L. R. Waldron.*

2276. Thomas, R. G. **Present and probable future distribution of wheat, sheep, and cattle in Australia.** Proc. Roy. Soc. Victoria 34: 117–127. *Fig. 1–3.* 1922.—The distribution is given by units of 5,000 acres of wheat, 10,000 head of sheep, and 1,000 head of cattle, based on the statistics of the year 1918–1919. Data on rainfall and temperature are also presented.—*Eloise Gerry.*

2277. Wenholz, H. **The conservation of fodder in New England.** Agric. Gaz. New South Wales 33: 783–789. 1922.—The crops and methods considered are those most profitable in averting stock losses due to drought in the winter season and in preventing a general unthrifty condition of stock. The fodder crops discussed are: cereal hay and straw, alfalfa, clover and sweet clover hay, maize stover, sorghum and Sudan grass hays, corn and sunflower silage, and oats and maize grain. Frequent comparisons are made with practices followed in the U. S. A.—*L. R. Waldron.*

2278. Werba, Karl. **Versuche mit Phosphathumus. [Experiments with "phosphathumus."]** Wiener Landw. Zeitg. 72: 59. 1922.—Experiments with this "colloidal, phosphorus-containing, bacterial fertilizer" on potatoes and sugar beets are reported. Only a slightly larger yield was obtained by applying 15 kgm. of phosphathumus per 100 square m. and no increase with 10 kgm. The dry season of 1921 was unfavorable for the development of bacterial activity, which is claimed to result from the use of this fertilizer.—Phosphathumus was first produced to utilize the surplus of Thomas slag in the iron industry. It is said to contain 8–10 per cent of soluble phosphoric acid, 1 per cent each of potassium oxide and nitrogen, and 15–20 per cent of calcium oxide, besides 1–2 millions of active bacteria per gram capable of

ammonification and nitrification. The claim for the quantity and activity of the bacteria is doubted because of the conditions of manufacture and storage.—*F. Weiss.*

2279. Whittet, J. N. **Winter grasses in the Orange district.** Agric. Gaz. New South Wales 33: 795–796. *1 fig.* 1922.—A comparison of native with seeded pastures showed the decided superiority of the latter. Grasses showing most promise were *Avena elatior*, *Phalaris bulbosa*, and *Bromus inermis*, the last for winter pasture. One hundred milking cows pasturing 3 hours daily for 10 months in 16 acres of *Phalaris bulbosa* and *Dactylis glomerata* failed to keep the grass pastured down.—*L. R. Waldron.*

2280. Williams, C. G. **The nitrogen inventory as affected by livestock vs. grain farming.** Jour. Amer. Soc. Agron. 14: 159–162. 1922.—The author points out that apparently a moderate increase in the nitrogen content of the soil and a slightly larger yield of crops result from the live stock system than from the grain system.—*F. M. Schertz.*

2281. Zailer, Viktor. **Vergleichende Anbauversuche mit deutschen und schottischen Kartoffelsorten in Admont.** [**Comparative tests with German and Scotch potatoes in Admont.**] Oesterreich. Zeitschr. Kartoffelbau 2: 17–19. 1922.—The German variety Jubel ranked 1st in every test on account of its resistance to disease, drought, and heat. The starch content and keeping quality of all potatoes was depressed owing to the short growing season. Varieties producing numerous small tubers had a higher starch content than those producing a few large ones.—*F. Weiss.*

2282. Zavitz, C. A. **Grains grown in combination for grain production.** Jour. Amer. Soc. Agron. 14: 225–228. 1922.—Barley, oats, wheat, and peas were grown separately and in combination. The greatest influence for high production was exerted by barley and the second highest by oats. If the proper varieties and proportions of barley and oats are grown together under favorable conditions a comparatively high yield of the mixed grain may be expected.—*F. M. Schertz.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. Dodge, *Editor*

(See also in this issue Entries 2340, 2525, 2783)

2283. Anonymous. **Subject index to periodicals, 1917–1919. Sec. K. Science and technology.** *Roy. 4 to, 555 p.* Library Association: 53 Bloomsbury Square, London, 1922. *35 s. net.*

2284. Anonymous. **The Royal Botanic Gardens, Kew.** Nature 110: 423–425. *1 fig.* 1922.—This is a brief description and history of the Gardens, with an aero-photo.—*O. A. Stevens.*

2285. Anonymous. **The year-book of the scientific and learned societies of Great Britain and Ireland. A record of the work done in science, literature, and art during the session 1921–22, by numerous societies and government institutions.** Compiled from official sources. *39th annual issue, demy 8 vo, vii + 374 p.* C. Griffin & Co., Ltd.: London, 1922.

2286. Anonymous. **Galton's centenary.** [Rev. of: Pearson, Karl. **Francis Galton, 1822–1922: A centenary appreciation.** (Department of Applied Statistics, University College, London. Questions of the Day and of the Fray, No. 11.) *23 p.* Cambridge University Press: London, 1922.] Nature 110: 335–336. 1922.

2287. Brinkmann, August. **Die neue biologische Meeresstation des Museums zu Bergen.** [**The new station for marine biology of the Bergen Museum.**] Bergens Mus. Aarb. Naturv. Raekke 1921/1922[1]: 1–28. *Fig. 1–14.* 1922.—A description is given of the new station

for marine biology of the Bergen Museum. The old station in the town was abandoned as its water supply was rendered impossible by the new constructions of the Royal Navy, and a new and larger station was erected on the island Herdla, 15 nautical miles from the town. The buildings and apparatus as well as the research ship "Herman Friele" are described.—*K. Münster Ström.*

2288. Fletcher, J. J. **Presidential address.** Proc. Linn. Soc. New South Wales 46: 1–13. 1921.—The author discusses the permanent establishing of the Australian National Research Council and the Commonwealth Institute of Science and Industry; the first Pan-Pacific Scientific Conference; the renewal of the regular meetings of the Australian Association for the Advancement of Science, and the local concerns of the Society.—*Eloise Gerry.*

2289. Jones, L. R. [H. H.] **Whetzel resigns headship—deplores present system of administrative tenure.** Phytopathology 12: 499–500. 1922.

2290. Jordan, David Starr. **The days of a man, being memories of a naturalist, teacher and minor prophet of democracy.** Vol. I. *xxviii + 710 p., 56 pl.* Vol. II. *xxviii + 906 p., 56 pl.* World Book Company: Yonkers-on-Hudson, New York, 1922.—This autobiography of a well known zoologist, educator, and statesman contains much information regarding botanists with whom he was associated, and the flora of places he visited, as well as his own early ventures in systematic botany and algology.—*C. W. Dodge.*

2291. L'Argus de la presse. Editeur. **Nomenclature des journaux et revues en langue française paraissant dans le monde entier.** [List of journals and reviews in French appearing in the whole world.] *433 p.* Paris, 1922.

2292. Pasteur, Louis. **Oeuvres de Pasteur reunies par Pasteur Vallery-Radot.** [Pasteur's works collected by Pasteur Vallery-Radot.] Vol. I. *viii + 480 p., portrait, fig.* Vol. II. *viii + 664 p., fig.* Masson & Cie.: Paris, 1922.—This edition aims to reprint all the editions of each work of Pasteur, reprinting the whole work wherever it was extensively revised by the author, otherwise giving minor variants as foot notes. The 1st volume contains those papers dealing with stereoisomerism, the 2nd those with fermentation and spontaneous generation.—*C. W. Dodge.*

2293. Sargent, C. S. **The first fifty years of the Arnold Arboretum.** Jour. Arnold Arboretum 3: 127–171. 1922.—The history of the Arnold Arboretum, which was founded in 1872, is related, its present condition and chief features described, and a systematic list of the genera of woody plants cultivated in the Arboretum given. This is followed by a long list of species and varieties introduced through the Arboretum into American gardens including a large number introduced for the first time into cultivation. An account is given of the herbarium, which now contains 200,000 specimens and a large number of fruits; of the library, which consists of 35,500 bound volumes and 8,000 pamphlets; and of the collection of 9,800 photographs. The work done by the Arboretum during the 50 years of its existence is described and its aims and future needs stated.—*Alfred Rehder.*

2294. Singer, Charles. **Early English magic and medicine.** Proc. British Acad. 9: [1–34]. 1920.—This article outlines briefly the history of British medicine, including manuscript herbals and their illustrations.—*C. W. Dodge.*

2295. Tavares, J. S. **José de Ascensão Guimarães.** Broteria Sér. Bot. 20: 130–146. *Portrait.* 1922.—The subject of this sketch was born at Faro, Portugal, in 1862, became a colonel of engineers, later retiring and entering business. His botanical works, noted in a bibliography of 6 titles, deal with Orchidaceae, Orobanchaceae, phyllotaxy, etc. He died at Lisbon in 1922.—*E. B. Chamberlain.*

2296. Tucker, Ethelyn M. **Bibliography notes.** Jour. Arnold Arboretum 3: 227–231. 1922.—The author gives the dates of publication of the following works published originally in parts: Mouillefert, Traité des Arbres & Arbrisseaux; Voss, Vilmorin's Blumengaertnerei; Willmott, The Genus Rosa; also a correction referring to a former note on "Nouveau Duhamel" [see Bot. Absts. 9, Entry 669].—*Alfred Rehder.*

2297. Visser, M. F. **S. Lako. 1848–1922.** Cultura **34:** 353–354. *1 pl.* 1922.—S. Lako was born in the province of Zeeland, Netherlands, studied chemistry and mechanics in Delft and agriculture in Proskau and Vienna. In 1905 the Dutch Government appointed him to take charge of the Institution for Agricultural Machineries in Wageningen. He died in Middelburg, November 1922, when 74 years old.—*J. C. Th. Uphof.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Arthur H. Graves, *Assistant Editor*

(See also in this issue Entries 2257, 2284, 2285, 2286, 2290, 2294, 2398, 2701, 2717, 2719, 2720, 2721, 2722, 2885, 2890)

2298. Anonymous. [Rev. of: Downing, E. R. **A naturalist in the Great Lakes region.** (The University of Chicago Nature Study Series.) *xxv + 328 p.* University of Chicago Press: Chicago, 1922.] Nature **110:** 444. 1922.

2299. Abel, R. **Bakteriologisches Taschenbuch: Die wichtigsten technischen Vorschriften zur bakteriologischen Laboratoriumsarbeit.** [Bacteriological pocket mammal; the most important technical directions for laboratory work in bacteriology.] 26 Auflage, bearbeitet von O. Olsen. *vi + 143 p.* C. Kabitzch: Leipzig, 1923.

2300. Bear, Firman E. **The teaching of soils.** Jour. Amer. Soc. Agron. **14:** 307–312. 1922.—A general discussion of the subject is given.—*F. M. Schertz.*

2301. Blomefeld, L. **A naturalist's calendar kept at Swaffham Bulbeck, Cambridgeshire.** *2nd ed.*, edited by Francis Darwin. *xviii + 84 p.* University Press: Cambridge, 1922.

2302. Etheridge, W. C., and M. L. Fisher. **Report of the committee on lectures for a standard introductory course in field crops.** Jour. Amer. Soc. Agron. **14:** 128–136. 1922.

2303. Forel, A. **Le monde social des fourmis. Tome II. Sensations, physiologie, fourmis et plantes, hôtes, parasites, et nids.** [The social world of the ant. Vol. II. Sensations, physiology, ants and plants, hosts, parasites, and ant-nests.] *8 vo, 184 p., 4 pl.* Libr. Kundig: Geneva, 1922.

2304. Goldschmidt, Richard Benedict. **Ascaris; eine Einführung in die Wissenschaft vom Leben für Jedermann.** [Ascaris; an introduction to the science of life for everyone.] *296 p., illus.* T. Thomas: Leipzig, 1922.

2305. Haskell, S. B. **A plea for experimental work in crops teaching.** Jour. Amer. Soc. Agron. **14:** 123–127. 1922.

2306. Miller, M. F. **Progress in standardizing the introductory courses in soils.** Jour. Amer. Soc. Agron. **14:** 217–222. 1922.

2307. Rich, S. G. **A successful apparatus for demonstrating osmosis.** School Sci. and Math. **22:** 857–858. 1922.

2308. Wells, A. B. **Tests in biology and general science.** School Sci. and Math. 22: 826–833. 1922.—The author gives copies of tests used, but no data regarding results.—*W. L. Eikenberry.*

CYTOLOGY

G. M. Smith, *Editor*

(See in this issue Entries 2436, 2437, 2504, 2509, 2540, 2631, 2632, 2636, 2637, 2638, 2730, 2783)

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*

Geo. D. Fuller, *Assistant Editor*

(See also in this issue Entries 2247, 2276, 2298, 2411, 2451, 2514, 2532, 2533, 2535, 2536, 2687, 2727, 2742, 2766, 2815, 2836, 2845, 2851, 2857, 2865, 2873, 2876, 2887)

FACTORS, MEASUREMENTS

2309. Horton, Robert E. **Results of evaporation observations.** Monthly Weather Rev. 49: 553–566. 1921.—A tabular statement of evaporation at 28 localities for various periods between 1913 and 1920 is given. The stations are chiefly located in the semi-arid plateau section from Texas to the Canadian line.—*E. N. Munns.*

2310. Pearsall, W. H. **A suggestion as to factors influencing the distribution of free-floating vegetation.** Jour. Ecol. 9: 241–253. *4 fig.* 1922.—The examination of some 400 complete analyses and several thousand partial analyses of European surface waters as well as the consideration of other data brings out the fact that calcareous waters tend to produce greater quantities of plankton than the sea. Such waters seem to be better nutrient media on account of their larger proportions of nitrates, phosphates, and silica. The mass of plankton must be, according to this hypothesis, some function of the limiting ion (or ions). Thus the sea, with 3.5 per cent of dissolved solids, may be a decidedly limited medium for plant growth because of the small amounts of phosphates and nitrates.—*Geo. D. Fuller.*

2311. Tobler, F. **Die Wolbecker Flechten-Standorte. [The lichen-habitats about Wohlbecker.]** Hedwigia 63: 7–10. 1921.—The Zoological Garden of Wohlbecker is a peculiar habitat with respect to the presence of old oaks and beeches, which are rare in the surrounding area. Since 1885, when Lahm completed his extensive study and collecting of the lichens, many of the older trees have fallen, and the habitat has changed greatly. In 1914, Tobler noticed that the lichens were dying in considerable numbers, and he supposed that the light requirements might no longer be favorable for their growth on portions of the trunks within reach. But observation showed that the lichens did not flourish better higher up on the trees, the development ceasing rather abruptly at certain heights. He therefore decided to obtain data regarding possible effects of atmospheric moisture. Selecting an oak tree, he found that at 9 in the morning there was 4 per cent more moisture on the north side of the base of the tree than on the east or west sides. At the height of his head the difference was 3.5 per cent in favor of the north side over the west side and 2.5 per cent higher than on the east side. Another tree showed slightly greater difference at the height of his head, and the atmospheric moisture was, as a whole, about 10 per cent lower than about the 1st tree. Correlated with this difference in moisture he found that *Pertusaria amara* was growing but sparingly on the 1st tree at a height of about 0.5 m. above the ground and on the north side only, while on the 2nd tree this lichen grew from 0.5 to 2 m. from the ground on the north side and extended around somewhat to the east and west sides. He concluded that changes in atmospheric moisture, due to development of the forest and removal of undergrowth, working through the years since Lahm collected the lichens, had been the main deciding factor in the changes that have occurred in the lichen flora. Further, he found the temperature to be about 2°C. lower on the north side of the tree than on other sides, and this lower temperature would probably supplement the difference in atmospheric moisture.—*Bruce Fink.*

2312. Tullson, H. **Prolonged plant activity at Grand Haven, Mich., in autumn of 1920.** Monthly Weather Rev. 49: 608-609. 1921.—Because of the mildness of the late fall and the occurrence of snow on the ground during periods of killing frosts and low temperatures, many plants blossomed profusely as late as Jan. 1, 1921, when with heavy frosts and ground free from snow all annuals which had been in a growing condition were killed.—*E. N. Munns.*

2313. Van Cleef, Eugene. **Rainfall maps of Latin America.** Monthly Weather Rev. 49: 537-540. *Charts 150-152.* 1921.—The distribution of the annual, summer, and winter rainfall over South America is shown in a series of charts. The vegetation gives little clue as to the possible reasons for the rather semi-arid condition of the llanos of Colombia and Venezuela.—*E. N. Munns.*

STRUCTURE AND BEHAVIOR

2314. Chodat, R., et L. Carisso. **La vegetation du Paraguay. XI. Borraginacees. B. La myrmecophilie des Cordia de la section Gerascanthus.** Bull. Soc. Bot. Genève 12: 172-200. *Fig. 313-327.* 1920.—Certain species of "fire ants" are known to inhabit cavities in the stems of *Cordia.* No one formerly recognized these growths as true galls. By means of a series of stages of such growths from several species of *Cordia* it was possible to demonstrate the presence of ant larvae in all of the earliest stages and the growths resulting from the presence of the ants were typical galls.—*W. H. Emig.*

2315. Christy, Miller. **The flowering-times of some British elms.** Jour. Bot. 60: 36-41. 1922.—Notes on the flowering time of *Ulmus nitens* and *U. montana* were made for a period of several years. The date of the appearance of flowers of *U. nitens* varied from the beginning of January to the beginning of February but in exceptional years the flowers appeared as early as the end of December or as late as the end of March. There was considerable variation also in the numbers of flowers and, as a rule, the majority produced infertile seed. *U. montana* flowered with fair regularity from the middle to the end of March, rarely as late as the 1st week in April. Usually a large number of flowers appeared and the majority of them produced fertile seed.—*Adele Lewis Grant.*

2316. Clark, J. Edmund. **Flowering dates of trees along the main British railway routes.** Nature 109: 210-212. 1922.—Inquiry was made to establish an observation that in traveling from the west of England to London fruit trees are seen to be more precocious toward London. Phenological reports give no direct data since fruit trees and garden flowers were excluded from the list on account of the numerous varieties. Studies were made from data of blackthorn, garlic, hedge-mustard, horse chestnut, and hawthorn, 35 stations being available for 1920, but the season was abnormally early. It is concluded that London is at least a week earlier than Penzance. Further discussion is made of details and modifying influences. The Hopkins bioclimatic law appears to hold. Further confirmation was found in the study of a manuscript received from Prof. Hopkins. "The success obtained seems to imply that from absolutely trustworthy phenological records of seasonal changes for a single station in the northern hemisphere for one single plant, the whole seasonal phenology for any other plant or crop can be postulated for any other spot in North America, Europe, or Asia."—*O. A. Stevens.*

2317. Dallman, A. A. **The pollination of the primrose.** Jour. Bot. 59: 316-322, 337-345. 1921.—From systematic field observations carried on in North Wales and Sussex for a period of several years, the author concludes that certain Dipterous and Hymenopterous insects are active agents in the pollination of primroses. Snails and slugs and certain beetles assist during the night time but no moths were seen visiting the flowers. A number of hitherto unrecorded insect visitors to primroses are listed.—*Adele Lewis Grant.*

2318. Lyon, C. J. **A phaenological study in New England.** Torreya 22: 19-28. 1922.—The correlation between temperature and the time of first flowering was studied in the vicinity

of Hanover, New Hampshire, for the years 1917–1921 inclusive. A table showing the time of first flowering for 104 species is presented, indicating a wide range of variation definitely correlated with the temperature factor.—*J. C. Nelson.*

2319. Pemberton, C. C. **Some notes of the growth of Arbutus Menziesii Pursh.** Canadian Field Nat. **36**: 21–26. *Fig. 1–4.* 1922.—On Vancouver Island there are large single trees of *Arbutus Menziesii* scattered on the plains, on margins of the forests, and on the sparsely wooded crests of hills and rocky elevations. Some trees give evidence of positive heliotropism. There was a continuity of flowering for 4 growing seasons. All stages from young buds to mature fruits occurred simultaneously.—*W. H. Emig.*

2320. Pessin, Louis J. **Epiphyllous plants of certain regions in Jamaica.** Bull. Torrey Bot. Club **49**: 1–14. *Pl. 1, fig. 1.* 1922.—A report is made of a study, in the field and laboratory, of epiphyllous plants in Jamaica. Possible modes of attaining the epiphyllous position are given as: continual growing forward and dying off below, of bryophytes, until they reach and cover the leaf; distribution, by rain and wind, of spores, etc.; and propagation of lichens and bryophytes by displaced fragments. Abundance of humidity, moderate temperature and calm atmosphere encourage epiphyllous growth. No penetration of the leaf by the epiphyll could be detected. Epiphyllous hepatics have specially adapted rhizoids. There is a possible relation between epiphyllous modes of life and parasitism.—*P. A. Munz.*

2321. Plitt, Charles C. **A preliminary report, with notes, on the lichens found near the Cinchona Botanical Station, Jamaica, British West Indies.** Bryologist **24**: 60–64. 1921.—The author collected about 200 species of lichens near Cinchona in the summer of 1919. The actual enumeration of species is left for a subsequent article. The present paper outlines the physical and climatic conditions of the locality, and notes the habital and ecological relationships of the lichens found. For this purpose the species are roughly classified as fruticose, foliose, and crustose forms, only the first set being included in the present instalment.—Some tests of water absorption showed that air-dried material of *Cladonia aggregata* exposed to rain would take up 110 per cent of its weight of water, *C. pycnoclada*, 200, *Sticta aurata*, 300, and *Leptogonium bullatum*, 400 per cent. [See also following entry.]—*E. B. Chamberlain.*

2322. Plitt, Charles C. **A preliminary report, with notes, on the lichens found near the Cinchona Botanical Station, Jamaica, British West Indies.** Bryologist **24**: 70–74. 1921.—This concluding part of the report deals with foliose, crustose, and epiphyllous lichens. It is, in the main, a running account of collections andecological notes. The author concludes that *Sticta* and *Leptogonium* seem best able among the foliose lichens to endure shade, often extending horizontally outward and spirally around tree trunks to utilize the light. [See also preceding entry.]—*E. B. Chamberlain.*

2323. Thompson, H. Stuart. **The mild weather.** Nature **106**: 728. 1921.—*Hutchinsia petraea* was found in blossom Jan. 24 near Bristol. The usual period is from Mar. to Apr. The hazel was in full flower on Jan. 5.—*O. A. Stevens.*

VEGETATION

2324. Adamson, R. S. **Studies of the vegetation of the English chalk, I. The woodlands of Ditcham Park, Hampshire.** Jour. Ecol. **9**: 113–219. *6 p., 13 fig.* 1922.—This includes a detailed study of 4 types of woodland, namely, beech and oak-hazel forests and 2 sorts of coppice. The data concerning the habitats include mechanical and chemical analyses of the soils including H-ion determinations, light intensities measured by actinic paper, evaporation determinations by the Yapp atmometer, humidity, rainfall, and temperature data from meteorological records. Extensive plant lists give an analysis of the flora. On the chalk soils 2 types of forests dominated by *Fagus silvatica* are described. On west-facing slopes such woods have few shrubs and a sparse ground flora in which *Sanicula europaea* and *Epilobium angustifolium* are most abundant, the former in the deep shade and the latter where more light pene-

trates. On the north-facing slopes *Mercurialis perennis* forms much of the ground flora. On the plateau more grasses and mosses occur under the beeches. In the "calcicolous coppice" *Cornus* and *Fraxinus* are most abundant while in a "transition coppice" *Corylus*, *Fraxinus*, and *Betula* are dominant. These coppices are related to the different types of beech forest.—An oak-hazel forest is developed on some of the deeper leached soils. *Quercus robur* is here the chief tree but *Betula alba* and *Fraxinus excelsior* are usually present in considerable numbers. The chief shrub is *Corlyus avellana* with *Cornus sanguinea* and *Euonymus europaeus* rather abundant. The undergrowth shows several variations but *Mercurialis perennis* is generally abundant.—*Geo. D. Fuller.*

2325. Chodat, R., et G. Beauverd. **Herborisation du 17 juin aux Buxaies de la Sarraz (Vaud).** Bull. Soc. Bot. Genève **12:** 142–148. 1920.—The spring flora near Sarraz is divided into a number of ecological groups.—*W. H. Emig.*

2326. Dice, L. R. **Biotic areas and ecologic habitats as units for the statements of animal and plant distribution.** Science **55:** 335–338. 1922.

2327. Handel-Mazzetti, Heinr. **Übersicht über die wichtigsten Vegetationsstufen und -formationen von Yünnan und SW. -Setschuan. [Survey of the principal vegetation zones and formations of Yunnan and southwest Setschuan.]** Bot. Jahrb. **56:** 578–597. 1921.—This is an elaboration of a paper first published in 1916 [Sitzungsber. Akad. Wiss. Wien (Math.-Naturwiss. Kl.) July 1916, Nov. 1917, and Jan. 1920] and is based on the vertical distribution of about 400 indicator plants. The author discusses his conclusions in comparison with those of Wilson. Because of complications due to the deep narrow valleys in the mountains it was necessary to treat this area separately from the Yunnan tableland. The subject matter is treated under the following headings: A. Tropical province. (1) Tropical rainforest; (2) tropical savanna; (3) jungle; (4) sclerophyllous bush; (5) subtropical savanna forest; (6) water plants. *Musa sapientum* and *Carica papaya* are characteristic cultivated plants.—B. Region of Yunnan tableland. (1) Subtropical zone (about 1800 m.), dry in summer, temperature 18–30°C. in summer; (a) subtropical savanna forest, (a^1) lower part with succulents, *Citrus*, and *Saccharum*, divided into southern zone and northern zone, (a^2) upper part, without succulents; (b) grass steppes; (c) ravine forest; (d) rock desert; (e) sand steppes. (2) Warm temperature zone, 1800–2900 m., of which 9 associations are recognized and described.—C. Region of high mountains of North Yunnan and southwest Setschuan including 6 zones as follows: subtropical, warm temperate, temperate, cold temperate, high mountains, and snow zones, with extensive subdivisions under each.—D. Northeast Birma- and West Yunnan high mountains, divided also according to climate into subtropical, warm temperate, temperate, cold temperate, high mountains, and snow regions with extensive subdivisions.—*K. M. Wiegand.*

2328. Hastings, G. T. **Succession of algae in the Grassy Sprain reservoir.** Jour. New York Bot. Gard. **22:** 64–66. 1921.—In this artificial reservoir near New York City there is a succession of algae throughout the season. The green algae reach their maximum in late May and early June, and the blue-greens in September.—*H. A. Gleason.*

2329. Howe, Marshall A. **The "working" of Long Lake.** Jour. New York Bot. Gard. **22:** 156–159. 1921.—The "working" of this lake at the New York Botanical Garden was caused by the prolific development of *Oscillatoria prolifica* (Grev.) Gomont.—*H. A. Gleason.*

2330. Kenoyer, L. A. **Forest formations and successions of the Sat Tal Valley, Kumaon Himalayas.** Jour. Indian Bot. **2:** 236–258. *6 pl., 3 fig.* 1921.—Sat Tal Valley lies just north of the outermost range of the Himalayas, at 29° 23′ N. Lat., 79° 32′ E. Long. Altitudes vary from 4160 to 5860 feet. At this elevation the 3 great forest formations of the lower Himalayas—monsoon deciduous, broad leaf sclerophyll, and *Pinus longifolia*—meet. Frost may occur down to 4000 feet. The annual rainfall is 85 inches, of which 84 per cent falls during June–

Sept. The monsoon deciduous forest, ranging from 2500 to 5500 feet, is dominated by *Bauhinia variegata*, *B. retusa*, and the giant liana *B. Vahlii;* other common trees are *Terminalia* spp., and *Grewia asiatica*. This forest reaches its upper limit in the Sat Tal Valley, where it is confined to southerly exposures. It is determined by a periodic precipitation, and a temperature that seldom falls below freezing. Most of the trees are deciduous; leaf fall with some species begins in the winter, and during March–May most of the species are bare. A large number flower at this time. Leaf fall appears to be due to moisture deficiency; but it is surprising that most of the deciduous species put out new leaves before the monsoon has begun. Commonly the new leaves do not appear till the fruits are mature; young trees and staminate trees were observed to leaf out much sooner than fruit-bearing trees. The broad leaf sclerophyll formation in the Himalayas falls into 3 altitudinal zones, each dominated by a distinct species of *Quercus*. Only the lowest of these zones, extending from the monsoon deciduous forest to 8000 feet, and dominated by *Q. incana*, occurs at Sat Tal. With this oak are *Rhododendron arboreum* and *Pieris ovalifolia*. This forest reaches its lower limits in the Sat Tal Valley, and is confined to cooler, shadier northerly exposures, and to moist depressions. It requires a winter temperature falling somewhat below freezing, and greater humidity than the monsoon deciduous forest. None of the dominant trees are ever quite leafless. The *Pinus longifolia* forest contains no other important species; it attains greatest development between 4000 and 6500 feet, and is always confined to dry exposed ridges and hilltops. In the Sat Tal Valley the monsoon deciduous forest occupies the warmer south-facing slopes and valleys, the *Quercus incana* forest the cooler north-facing slopes and valleys, while the *Pinus longifolia* is found on the dry ridges between them. The author attempts to work out both hydrarch and xerarch successions, though the valley has been protected from grazing, cutting, and fire for only a few years. He concludes that "the pine and the *Bauhinia* seem to be xerarch pioneers" in this area, "and the oak is the climax toward which the former two tend." Seasonal periodicity is a marked feature of the vegetation. During the monsoon, June–Sept., the herbaceous vegetation shows decided tropical affinities, while in the autumn and spring the undervegetation is more like that of temperate regions. Lianas and parasites are rather abundant. Epiphytic lichens, mosses, and ferns are abundant in the oak forest, and orchids are common in the monsoon deciduous forest. A list is appended of about 75 tree and 65 shrub species observed by the author.—*Winfield Dudgeon.*

2331. Malta, N. Ökologische und floristische Studien über Granitblockmoose in Lettland. [Ecologic and floristic studies of the mosses on granite erratics in Livonia.] Latvijas Augstskolas Raksti (Acta Universitatis Latviensis) 1: 108–124. 1921.—Floristically, granitic erratics in the lowlands are interesting from the presence of montane species far below the usual levels; ecologically, the erratics, through restricted area and constant character of the substratum, permit easy determination of the effect of varying conditions of atmosphere and insolation, and facilitate the study of the impact of different plant associations. The thinnest layers of soil over a granitic erratic change the moss flora profoundly, often with sharp contrasts between top and sides of the block, while a limestone block will make its influence felt through the accumulated material. Hence a granite block may show rapid change in its flora in the course of years, at times becoming wholly submerged by inroads of surrounding associations. This submergence is conditioned by the size of the block, presence of moisture, insolation, slope of the sides, and the relative vigor of surrounding associations. Per contra, large blocks in sunny places show great fixity in their moss flora even over long periods, though the surrounding terrain is undergoing constant change through cultivation, if only mechanical injury from men or animals is absent. The changes in moisture, as through drainage of swamps, seem to produce the most rapid changes in flora.—The colonization of new plants on bare blocks seems dependent upon the relief of the surface and hence upon the petrologic composition. Smooth surfaces seem first occupied by lichens between which mosses later appear; rough surfaces support a large flora in the minute hollows, as many as 27 plants (13 species) to the square m. being noted.—Four moss associations may be recognized, 3 conditioned by sunlight (the Grimmia-association of full sunlight, the shady-thicket-association, the woodland-association), and 1 (the hydrophyte-association) by water content. Lists of species

characteristic of each association are given, and a general list of 15 hepatics and 96 mosses considered as true granite dwellers. A bibliography of 10 titles follows.—*E. B. Chamberlain.*

2332. O'Donoghue, Chas. H. **A preliminary survey of the biota of a sand spit in Lake Winnipeg.** Canadian Field Nat. 35: 121-131. 1921.—This sketch of the life conditions on a sand spit of Berens Island includes a list of plants arranged according to zones and frequency.—*W. H. Emig.*

2333. Pease, A. S. **Gray pine and arbor vitae.** Rhodora 23: 247-249. 1921.—Observations were made from the car window upon the growth of *Pinus Banksiana* and *Thuja occidentalis* along the line of the Algoma Central and Hudson Bay Railroad from Salt Ste. Marie, Ontario, northward for nearly 300 miles, and extended eastward along the line of the National Transcontinental Railway toward Quebec. In general, the 2 species were not seen in the same regions and where their ranges overlapped there was evidence of a decided difference in their habitats, to this extent corroborating the conclusions of Fernald in respect to these 2 species [see Bot. Absts. 4, Entry 283.]—*James P. Poole.*

2334. Poisson, H. **La flore septentrionale de Madagascar et la flore malgache. [The northern flora of Madagascar and the Madagascan flora.]** Rev. Gen. Bot. 33: 577-588, 694-707, 758-770. 1921.—The flora is influenced by 3 factors—soil, climate, and man. Of the 3, man has caused most change. Three regions are considered from a geological and geographical point of view,—the central part, and the western, and eastern coasts of Madagascar.—The Madagascan flora is becoming uniform due to the extension of the savannas; it will return to regional characteristics very slowly because the soil will be recovered by cultivated plants. From the point of view of the botanist this loss of rare and curious species is to be regretted, but the development of agriculture is for the greater good of Madagascar. It would be better to cut the brush than to burn it for then in the places inaccessible for cultivation many interesting forms would be found among the remaining species.—The flora is divided into 4 groups based on the types of soil on which they grow. These groups are: (1) the limestone flora, presenting a majority of xerophytes; (2) the sand and sandstone flora; (3) the savanna flora, chiefly Gramineae; and (4) the tropical forest flora. Lists of the plants found in these localities are given.—*J. C. Gilman.*

2335. Poncy, R. **Contribution a la biologie des tourbieres Genevoises. [Contributions to the biology of the Swiss bogs.]** Bull. Soc. Bot. Genève 12: 150. 1920.—This paper includes observations of *Iris pseudacorus* L. and *Nymphaea alba* of the Swiss bogs.—*W. H. Emig.*

2336. Uphof, J. C. Th. **Ecological relations of plants in southeastern Missouri.** Amer. Jour. Bot. 9: 1–17. *2 pl., 3 fig.* 1922.—The author describes the geology, topography, and climate of this region. There are 2 main ecological areas, the Ozark Hills and the bottom lands along the rivers. He describes the plant associations and lists the important species of the dry barren hills and of the richer lower slopes in the Ozarks, and of the ponds, swamps, and forests of the bottom lands.—*E. W. Sinnott.*

2337. Wilson, E. H. **Notes from Australasia. II. The New Zealand forests.** Jour. Arnold Arboretum 2: 232–236. 1921 [1922].—New Zealand, before its settlement by white men, was for the most part densely clothed with a mixed rain forest in which old types of taxads and conifers were the dominant trees; of these the most valuable timber trees are *Dacrydium cupressinum* Sol., 4 species of *Podocarpus*, and *Agathis australis* Steud., the Kauri, the tallest of the New Zealand trees, attaining a height of 150 feet. These trees have the roots clothed with tubercles analogous to those of leguminous plants which contain nitrogen-fixing bacteria. This explains the slow and poor regeneration of these trees on the deforested areas where the soil has become unfit for their growth, on account of the destruction of the bacteria by exposure and fire. Ruthless destruction during the last century has reduced the forested area greatly,

and as the regeneration of the taxads and conifers is difficult in the dense forest because of the shade, and on the deforested areas for the reason stated above, the broadleaf dicotyledonous trees, which are of less commercial importance, will supersede these older types.—*Alfred Rehder.*

FLORISTIC PLANT GEOGRAPHY

2338. Bews, J. W. **The south-east African flora: its origin, migrations and evolutionary tendencies.** Ann. Botany 36: 209–224. 1922.—The flora of Southeast Africa is composed of 2 distinct elements, a tropical-subtropical one and a temperate one. The tropical flora has invaded the region along the coast-belt, where it remains distinctly tropical. Toward the south the tropical species are gradually replaced by allied subtropical forms. Migration has also occurred toward the interior from the coast-belt along the river valleys which run at right angles to the coast. In this direction also the flora soon becomes subtropical in association with the higher altitude, lower temperature, and drier conditions. When allied tropical and subtropical forms are compared in respect to floral morphology it is generally found that the former are more primitive. It is concluded that the subtropical forms are derived from the tropical element in adaptation to the changed conditions. The temperate element has migrated along the great mountain ranges which run parallel to the eastern coast across the tropics and connect with the southwestern Cape region. When allied tropical and temperate forms are compared in regard to floral morphology, it is found that in many families the tropical element is the older while in others the temperate representatives have retained more of the primitive floral characters. Particular examples are given of tropical genera (e.g., *Rhus*) which have produced species that have invaded temperate regions and also of temperate genera (e.g., *Pelargonium*) which have invaded the tropics.—*W. P. Thompson.*

2339. Harper, Roland M. **Cape Cod vegetation.** Torreya 21: 91–98. *2 fig.* 1921.—A bibliography of the various papers dealing with the flora of the Cape is presented. None of these describes the vegetation in detail. In surface features and plant topography the Cape resembles Long Island. Though formerly destitute of trees, there is now considerable forest. The author spent 3 days in October, 1920, studying the vegetation. Lists are presented of the plants observed, including 16 trees, 4 woody vines, 16 shrubs, 4 undershrubs, and 20 herbs. Ten of the entire list are thought to be introduced. *Pinus rigida* is the most abundant tree. Nearly all of these plants grow also on Long Island. Many species common in the interior of New England are absent.—*J. C. Nelson.*

2340. Nelson, Edward W. **Lower California and its natural resources.** Mem. Nat. Acad. Sci. [U. S. A.] 16: 1–194. 1921.—In this treatment of the Peninsula of Lower California the following sections are of especial botanical interest: Plant Life, p. 103–110; Life Zones, p. 121–132; Natural Resources in Animal and Plant Life, p. 132–136; Scientific Explorations, p. 140–147; Bibliography of Lower California, p. 147–171. The author considers that the vegetation of the Peninsula has been derived from 3 sources. The northwestern portion, consisting chiefly of the San Pedro Martir Mountains, bears a flora that is identical with that of the mountains of southern California. The southern third shows a strong infusion of species from the arid tropical lowlands and low mountains of Sinaloa. The remaining two thirds shows a close connection with desert regions of southwestern U. S. A. and northwestern Mexico. The flora of the Peninsula is characterized as being one of the most remarkable desert floras in the world.—*Roxana Stinchfield Ferris.*

2341. Palmer, Ernest J. **The forest flora of the Ozark region.** Jour. Arnold Arboretum 2: 216–232. 1921 [1922].—The author gives a brief account of the topography, geology, and climate of the Ozark region bounded on the east and north by the valleys of the Mississippi and Missouri rivers, on the south by the Gulf Coastal Plain, and on the west by the Great Plains. It is one of the oldest land areas of the continent and consists chiefly of older palaeozoic sedimentaries. The annual rainfall through almost the entire Ozark region averages between 35 and 40 inches. The composition of the forest flora and its different formations are de-

scribed and it is stated that about 90 per cent of the woody plants belong to the Gulf Coastal Plain flora. Numerous colonies of northeastern woody plants together with many herbaceous species are found on the northern and eastern slopes of bluffs and steep hillsides. It is stated that the movement of the southern flora toward the north is of comparatively recent inception and still in active progress, the less hardy species gradually disappearing toward the north; the forest is encroaching upon the prairies of the northwestern portion and upon the treeless hills characteristic for some sections of the western part of the region and is driving back the remnants of the flora of the western plains which still exist in these parts.—*Alfred Rehder.*

2342. Williams, M. Y. **Biological notes along fourteen hundred miles of the Mackenzie River system.** Canadian Field Nat. 36: 61–66. 1922.—Besides observations on the fauna of the region, there is a short list of flowering plants and a few notes on the ecological associations.—*W. H. Emig.*

APPLIED ECOLOGY

2343. Anonymous. **Searching the world for new food plants.** Sci. Amer. Monthly 3: 516–518. *6 fig.* 1921.—A brief account is presented of the expedition of H. L. Shantz and Reval through darkest Africa in quest of new fruits, nut plants, and forage crops.—*Chas. H. Otis.*

2344. Diehl, G. B. **Relation between the rainfall, temperature and the yield of corn in Argentina.** Monthly Weather Rev. 49: 543–548. *Fig. 1–6.* 1921. [Translation of: Hessling, N. A. **Relaciones entre la lluvia, la temperatura y el rendimiento del maiz.** Bol. Mens. Oficina Meteorol. Nacion. Oct., 1918.]—The relation between yields and climate for corn has been found to be the precipitation during the Oct.–Jan. period with temperature a minor factor. In the calculations, the coefficient of correlation was used.—*E. N. Munns.*

2345. Sladen, F. W. L. **Fireweed as a honey-plant.** Agric. Jour. [British Columbia] 6: 122. 1921.—The status of this plant as a honey producer is discussed with some reference to local conditions.—*J. W. Eastham.*

2346. West, Frank L., and N. E. Edlefsen. **The climate of Utah.** Utah Agric. Exp. Sta. Bull. 166. *66 p., 18 fig.* 1919.—This is a summary of the climatic conditions of Utah, based upon a careful study of weather data taken at the leading town of each county in the state. The amount and distribution of rainfall and the length of the growing season are shown in graphic form for each county.—*B. L. Richards.*

MISCELLANEOUS

2347. Hofer-Heimhalt, H. **Die Geologie der Torfmoore.** [**The geology of peat-moors.**] Naturwissenschaften 9: 260–265, 280–285. 1921.

2348. Sumner, F. B. **The organism and its environment.** Sci. Monthly 14: 223–233. 1922.—It is held that morphologists, physiologists, taxonomists, geneticists, etc., all too often ignore or inadequately consider the environment when investigating an organism in part or as a whole.—*L. Pace.*

2349. Taylor, Norman. **Flora of Mt. Marcy.** Ann. Rept. Amer. Scenic and Hist. Preservation Soc. 25: 317–318. 1920.

FOREST BOTANY AND FORESTRY

J. S Illick, *Editor*

(See also in this issue Entries 2229, 2269, 2324, 2330, 2510, 2689)

2350. Anonymous. **Annual return of statistics relating to forest administration in British India for the year 1919–20.** *25 p.* Simla, 1921.—Summaries are presented for British

India forest work, and among the important subjects discussed are working plans, forest offenses, fire protection, grazing, planting, forest utilization, forest income, and forest area.—*S. B. Show.*

2351. Anonymous. **Les lignes électriques à travers les forêts.** (Conférence de M. W. von Arx, inspecteur des forêts de la ville de Soleure, à la réunion de la Société Forestière Suisse à Aarau, le 29 août 1921.) [The electrical lines across the forests.] Jour. Forest. Suisse **73**: 6–10. 1922.—It is proposed to check by proper legislation the unscrupulous expansion of transmission systems by electro-technic interests, which are ignoring entirely forestry and esthetic considerations. It is desirable to eliminate shortcomings of existing laws, which differentiate between public and private utilities companies.—*G. Kempff.*

2352. Anonymous. **Progress report of forest research work in India for the forest year 1919–20, including the administration report of the Forest Research Institute, Dehra Dun.** *56 p.* Allahabad, 1920.—This is the 1st general summary of the research work of the Indian Forest Service, and covers all phases of the work, both that done at and under the direction of the Central Institute at Dehra Dun and the work in the various provinces. One chapter each is devoted to silviculture and working plans, forest botany, forest economy, forest zoology, forest chemistry, as the major subdivisions of research work, and 1 each to a general survey of the situation and to forest publications. A total of 294 permanent sample plots are now under observation by the Central Institute, in addition to others carried by the provincial offices. The experiments in regeneration are largely devoted to study of sal. Experimental work in regeneration of the evergreen forests of Eastern Assam have been initiated. In Burma extensive work with teak regeneration has been undertaken. In Madras regeneration of the deciduous semi-evergreen forests is being studied. The diseases of sal dominate as the principal studies under forest botany. Studies in forest economy are being started extensively. Pulp and paper, antiseptic treatment, seasoning, mechanical properties, by-products, veneers, cooperage, new uses and technical qualities are all being studied. Insects affecting sal and teak especially are studied. The gums, resins, camphor, turpentine and tannins from oaks are also being investigated.—This publication is designed primarily to give workers in India a complete picture of the experiments under way, but will be welcomed by those in other countries who have heretofore been obliged to look through numerous special provincial reports to secure the information here brought under one cover.—*S. B. Show.*

2353. Anonymous. **The progress of state afforestation.** [Rev. of: Anonymous. **Second report of the forestry commissioners: Year ending Sept. 30, 1921.** H. M. Stationery Office: London, 1922.] Nature **110**: 369–370. 1922.—On account of reduced appropriations a leasing policy was pursued. The commission secured over 68,000 acres of which nearly 8,000 were planted. Small grants to land owners secured the planting of 11,000 acres on private estates. Afforestation provides work for the unemployed. Material assistance was received from the Unemployment Fund. Four schools for apprentice woodmen were established, and experimental work is in progress on 79 sample plots.—*O. A. Stevens.*

2354. Anonymous. **Forest policy and forest management.** [Rev. of: (1) Schlich, W. **Schlich's manual of forestry. Vol. I. Forest policy in the British Empire.** *4th ed., rev. and enlarged, xi + 342 p.* Bradbury, Agnew and Co.: London, 1922. (2) Hawley, R. C. **The practice of silviculture; with particular reference to its application in the United States.** *xi + 352 p.* J. Wiley and Sons: New York; Chapman and Hall: London, 1921. (3) Chapman, H. H. **Forest mensuration.** *xxii + 553 p.* J. Wiley and Sons: New York; Chapman and Hall: London, 1921 [see also Bot. Absts. 12, Entry 398]. (4) Jackson, H. **A short manual of forest management.** *x + 70 p.* University Press: Cambridge, 1921.] Nature **110**: 407–409. 1922.

2355. Afzal, Muhammed. **Progress report of forest administration in Baluchistan for 1919–20.** *iii + 25 p.* Calcutta, 1921.—Chil (*Pinus longifolia*) seedlings which were watered during the summer have done well, while those untended have died. In general the problem

is to protect and develop the forests of this province, which is much behind most of the other provinces of India. The usual detailed tabulations of area, offenses, fires, output, receipts, expenditures, etc., are given.—*S. B. Show.*

2356. Afzal, Muhammed. **Progress report of forest administration in Baluchistan for 1920–21.** *iii + 24 p.* Calcutta, 1922.—The usual detailed tabulations of area, offenses, output, receipts, expenditures, etc., are given. The forests of the Zhob district are administered by the political agent and are reported on separately.—*S. B. Show.*

2357. Altson, A. M. **Beetles damaging seasoned timber: With an account of their ravages and the method of treatment.** *Roy. 8 vo, 24 p.* Wm. Rider & Sons: London, 1922. *2s. 6d. net.*

2358. Badoux, H. **Quelques observations sur les dégât causés récemment par la pyrale grise du mélèze.** [**Some observations of recent devastations by the gray larch caterpillar.**] Jour. Forest. Suisse **73**: 1–6. *1 pl.* 1922.—The gray larch caterpillar (*Steganoptycha pinicolana*) defoliates larch stands (*Larix europaea*) by devouring the needles. Its life cycle and habits are briefly described. All the damage is caused during the larval stage, in 23–28 days during May and June, and consists essentially of a loss of growth. The infestations occur at regular intervals of about 9 years, each invasion lasting 2–3 years. The danger of infestation to larch stands may be lessened by appropriate preventive measures, such as thinnings, mixed stands, etc.; but all repressive measures tried have proved unsuccessful.—Observations made during the summer of 1921 show extensive infestations and depredations not only in larch but also in Cembran and mountain pine. The attack occurred exclusively upon the current annual shoots, principally the leader, resulting in a considerable loss of growth.—*G. Kempff.*

2359. Barbey, A. **La Nonne dans les Alpes valaisannes.** [**The gypsy moth in the Valaisan Alps.**] Jour. Forest. Suisse **73**: 21–25. *1 pl.* 1922.—The author describes the first known moth invasion of the Swiss forests, which occurred during the dry summer of 1921. An unidentified moth attacked a stand 1 hectare in size, located in the communal forest of Ernen just above the junction of the Binna and the Rhone rivers and composed of 90 per cent *Picea excelsa* and 10 per cent *Pinus sylvestris* 60–80 years old. The observations on the habits of the insects and the resultant damage are reviewed, as well as the possible cause of the invasion. The utilization of all infested material and the complete burning of all the bark are the chief repressive measures put into effect.—*G. Kempff.*

2360. Bennett, H. C. **Progress report of forest administration in Coorg for 1920–21, with a review by the chief commissioner and orders by the government of India.** *2 + 16 + 14 p.* Bangalore, 1922.—As for the other divisions of India, the report for this year covers only a 9-month's period in order that the forest and fiscal years may be made to coincide. Among the important subjects discussed are reforestation, reproduction methods, eradication of lantana from sandal-bearing areas, care of plantation and teak taungyas, forest fires, protection, diseases, felling operations, forest products, market conditions, revenues, and expenditures. Research on the spike disease of sandal continued, though with inconclusive results, and a wide variety of other silvicultural problems are also being studied intensively. Protection-burning of grass hills was done with help from villages and with satisfacory results, no accidental fires being reported. The customary detailed tabulations of various phases of the department's work are included in the report.—*S. B. Show.*

2361. Billson, H. G. **Annual progress report of forest administration in the United Provinces for the forest year 1919–20.** *34 + lxxxv + 5 p.* Allahabad, 1920.—Forest area, working plans, road and trail construction, utilization operations, grazing, reforestation, timber sales, and forest incomes are among the important subjects considered. A summary of the report prepared by the Secretary to Government is included.—*S. B. Show.*

2362. Billson, H. G. **Annual progress report of forest administration in the United Provinces for the period July 1, 1920 to Mar. 31, 1921.** *28 + lxxiii + 3 p.* Allahabad, 1921.—This is a detailed report of the activities of the Forest Department, but is for 9 months only, so that the forest year may be made to coincide with the fiscal year. It considers fully the subjects of forest area, road and trial construction, forest improvements, offenses, grazing, reforestation methods, felling operations, and forest income. Insect inquiry to sal continues serious. Poor and good natural reproduction are reported respectively for sal and chir pine forests. Resin output doubled in the year. A summary of the report by the Secretary to Government is included.—*S. B. Show.*

2363. Blascheck, A. D. **Progress report on forest administration in the Punjab for the year 1919–20.** *16 + lxxiii y., map.* Lahore, 1920.—The report considers forest area, boundary surveys, working plans, forest offenses, fire protection, improvement and thinning work, cutting operations, forest income, and research. Late frosts damaged irrigated plantations.—*S. B. Show.*

2364. Blunt, A. W. **Progress report of forest administration in the Province of Assam for the year 1919–20.** *iii + 30 + 49 p.* Shillong, 1920.—This annual report covers all phases of the work of the department, including statistics on area, boundary surveys, output, receipts, expenditures, offenses, fires, grazing, etc. Progress was made in reserving village forests, which is an urgent problem. In the reserved forests only 933 square miles were open to grazing whereas all unclassed forests were open. The eradication of climbers from sal forests is in arrears, though 2,300 acres were treated; burning was resorted to in order to rid the ground of evergreens. Natural reproduction of sal and teak was poor, but was good in the evergreen forests of the east. Experiments in natural regeneration of the evergreen forests, which are to be clear cut, promise success. No tapping was done on the Ficus plantations because of the lack of a market. Extending the taungya plantations of sal met with only moderate success. Improvement fellings in the sal forests of the west covered 9,338 acres; in the evergreen forests of the east, clear felling is to be practiced. A fair amount of research work on sal and the regeneration of the eastern evergreen forests is under way. A general summary of the important features of the report of the Secretary to Government is a valuable feature of the report.—*S. B. Show.*

2365. Brubaker, H. W. **A study of the oil from sumac (Rhus glabra).** Trans. Kansas Acad. Sci. 30: 221–222. 1919/21 [1922].—The chemical properties of the oil from berries of *Rhus glabra* are compared with those of other vegetable oils such as cotton seed and corn oil. A use may be found for it as an edible oil, in soap making, or as a semi-drying oil in the paint industry.—*F. C. Gates.*

2366. Bub-Bodmar, F., und B. Tilger. **Die Konservierung des Holzes in Theorie und Praxis: Ein Handbuch.** [Handbook on the theory and practice of wood preservation.] *8 vo, xx + 1006 p.* P. Parey: Berlin, 1922.

2367. Cary, N. Leroy. **Sitka spruce; its uses, growth, and management.** U. S. Dept. Agric. Bull. 1060. *36 p., 20 pl.* 1922.—This bulletin is a survey of the Sitka spruce industry on the Pacific coast from Alaska to northern California. The geographical and altitudinal distribution is given, with estimates of the amounts available. The character of the wood, its uses, and methods of logging and milling are described, together with the reproduction, growth and management.—*J. Lincoln Cartledge.*

2368. Coulon, P. de. **Jardinage cultural ou méthode du contrôle.** [Practical or mathematical application of the single tree method.] [Rev. of: Biolley, H. E. **L'aménagement des forêts par la méthode experimentale et specialement la méthode du contrôle.** (Forest management by the experimental method, especially the method of control.) *91 p.* Attinger Frères: Paris, 1920.] Jour. Forest. Suisse 73: 25–29. 1922.—Biolley champions the mathe-

matical fixation of the cut in the working plan and its rigid application in the field. DeCoulon maintains that this is not feasible and should be omitted.—*G. Kempff.*

2369. Coventry, B. O. **Progress report of forest administration in the Jammu and Kashmir states for the year 1919-20.** (**Sambat 1976.**) *25 + lxiii p.* Lahore, 1922.—This is an annual report on the work of the Forest Department. The area of state forests increased from 9639 to 9714 square miles. Among the important subjects discussed are boundary surveys, working plans, road construction, offenses, fires, reforestation, felling operations, rafting, forest products, forest income, and forest expenditures. Natural regeneration, especially in deodar forests, is good. Elimination of the destructive grazing by goats through gradual increase in fee is now under way. A force of 200 of the military was employed to suppress the smuggling of kuth out of the state. The Srinagar fuel supply continues to be a problem, with planting of willow on swamp land as the only solution. As in other states of India, plans are under way for increasing the staff. The usual detailed tabulations covering all phases of forest work are included in the report.—*S. B. Show.*

2370. Cox, S. **Annual administration report of the forest department of the Madras Presidency (India) for the year ending June 30, 1919.** *87 + lxii + 11 p.* Madras, 1920.—This annual report covers in detail all forest operations. The control of the Department was transferred from the Board of Revenue to the newly appointed Chief Conservator. The area of reserved forest decreased from 18,837 to 18,712 square miles, while reserved lands rose from 668 to 682 square miles. Forest working plans, offenses, fire losses, protection, grazing research, forest utilization, and forest income are considered. Bamboo and sandal-wood were extensively exploited. The Madras Forest College has continued satisfactorily. A separate report is given for each of the 4 circles in the Presidency, with a general summary, a statement of progress in each line of work for the 5-year period, and detailed statements of receipts, expenditures, fire protection, grazing, etc., for the different circles and subdivisions thereof.—*S. B. Show.*

2371. Cox, S. **Annual administration report of the forest department of the Madras Presidency (India) for the three-fourths year ending March 31, 1921.** *83 + lxiii + 11 p.* Madras, 1921.—Since this report, covering in detail all forest operations, is for ¾ of the fiscal, instead of forest, year, the comparison with figures for previous years is impossible. It considers the subjects of forest area, boundary surveys, working plans, road construction, protection, offenses, grazing, utilization, and forest income. Protection burning was inaugurated. The possibilities of bamboo as a source of paper pulp are discussed. Important progress in the artificial regeneration of teak is noted. In the review of the report by the Government, the need for education of the people in the aims of the forest administration is emphasized. The forest college continued to work well. A separate report for each of the circles is given with a general summary for the entire Presidency, a review by the Government, and detailed statements of receipts, expenditures, fire protection, grazing, changes in area, etc., for the different circles and subdivisions thereof.—*S. B. Show.*

2372. Crothers, E. M. **Progress report of forest administration in Coorg for 1919–1920, with a review by the Chief Commissioner and orders by the Government of India.** *2 + 13 + 14 p.* Bangalore, 1921.—This is an annual report on all phases of forest administration. The area of reserved forests remained constant at 332,500 acres. Among the important subjects discussed are forest improvements, fire protection, grazing, planting, felling operations, forest income, and expenditures. Studies on the relation of lantana to sandal disease were continued as well as efforts to eradicate the pest on plantation and regeneration areas. Sowing of teak and cultural operations on previous plantations were continued. Considerable research work covering a wide range of subjects is being done: sample plots for growth and yield studies, attempts to produce artifically the "spike" disease of sandal, studies on soil aeration, natural reproduction, thinnings in teak, sowing and planting are all represented. The usual detailed tabulations covering areas, progress in various phases of the work, output, receipts, etc., are included.—*S. B. Show.*

2373. Dons, Carl. **Litt om store traer i Nord-Norge.** [A little about big trees in northern Norway.] Naturen 46: 220–236. *Fig. 1–12.* 1922.

2374. Gerry, Eloise. **Oleoresin production: A microscopic study of the effects produced on the woody tissues of southern pines by different methods of turpentining.** U. S. Dept. Agric. Bull. 1064. *46 p., 7 pl.* 1922.—Results clearly demonstrate that those methods of turpentining which conserve the vitality of the tree insure the greatest production of oleoresin. "Turpentining is not merely a draining out of the gum already formed; it is a collection of the oleoresin constantly being manufactured by the tree." Production is greatly increased due to wounding. Cupping in place of boxing eliminates unnecessary injury to the tree and the proper spacing and placing of the faces on the tree are matters of fundamental importance. It is unprofitable to turpentine trees less than 10 inches in diameter by present commercial methods. Turpentining does not effect the wood already formed, except the living parenchyma in the outer sapwood, the resin passages which contribute much of the yield. Structure of the wood produced after wounding is considerably modified especially above the face, where many more resin passages are formed. This is greatest about 1 foot above the wound and still slight at 6–9 feet above. Although the increase in resin passages is an important factor in securing a high yield, they are not the only, or perhaps not even the chief, source of the turpentine. Differences in chipping methods effect structure of the wood and production. Heavy chipping is much more injurious to the tree and gives lower sustained yield than conservative narrow chipping. The former results in delay in wood formation, in formation of resiniferous tissue, in a reduction in the width of annual rings, and in thickness and amount of walls of the summer wood, while conservative narrow chipping largely overcomes these disadvantages. Wood formation, especially the width of the growth rings and the amount of summer wood produced by uninterrupted trees of the same locality, was taken as the standard for estimating the effects of the different chipping methods. Many miscellaneous observations and suggestions of further problems are added.—*J. T. Buchholz.*

2375. Grieve, J. W. A. **Progress report on forest administration in the Punjab for the year 1920–21.** *19 + lviii p., map.* Lahore, 1921.—The report covers only a 9-month's period, since, as in other provinces, the forest year and fiscal year are being made to coincide. The area controlled by the Department was reduced from 6744 to 6626 square miles chiefly by devoting lands to colonization. This is only 7 per cent of the total area of the Punjab. Among the important subjects discussed are working plans, labor problems, transportation facilities (including ropeways), forest offenses, fires, reforestation, forest products, seasoning, forest income, and forest expenditures. Experiments in raising conifers in combination with field crops have been started. Much resin continues to be collected and progress is reported in making an acceptable standard product. The Punjab Government has authorized adequate financing for developing forest resources, both by government loans and cooperative profit-sharing plans. The administration has been reorganized by creation of Chief Conservator and Utilization Conservator positions. The drought has affected the work of the Department by making labor more plentiful than before. The usual detailed statements of areas, receipts, etc., are a part of the report, and an abstract of the entire report, prepared by the Revenue Secretary to the Government, is a valuable feature.—*S. B. Show.*

2376. Grist, D. H. **Kapok.** Malayan Agric. Jour. 10: 51–55. 1922.—*Eriodendron anfractuosum*, the source of the fiber Kapok, is not very common in the Malay Peninsula. In the Straits Settlements the number of trees seems to be only about 10,000. It has a great enemy in the white ant, which in the drier soil destroys it and is a limiting factor to its natural distribution. The tree fruits as young as 4 years. The life of the tree may be 50 years. The seed contains over 20 per cent of oil.—*I. H. Burkill.*

2377. Henry, Augustine. **The western larch in cultivation.** Quart. Jour. Forest. 16: 161–174. 1922.—Western larch has not proved a successful introduction to Great Britain on account of the insular climate. It is susceptible to canker and in seedbeds yields, as a rule,

only a small proportion of vigorous seedlings. It is very intolerant of shade, narrow of crown, and unable to smother the grass which springs up in plantations. In its native habitat the larch differs remarkably from other species in the rapid ripening of cones, which shed their seed completely in September. The production of cones in most years is small, good crops being rare. Germination tests indicate a variation in the quality of the seed from 5 to 65 per cent. Seed steeped for 3 weeks gave excellent germination. As the cones ripen the heaviest seed fall out first so that collectors arriving after the cones start to open gather a larger proportion of small seed than the trees actually produce. Plantations in Great Britain show 5–10 per cent good trees, 10–15 per cent small trees, and 75–85 per cent of useless weaklings. The paucity of good trees in a plantation is the worst fault of *Larix occidentalis*. In Idaho the seed requires considerable moisture and heat up to 90°F. for successful germination. Under storage it retains its vitality well, having germinated 20 per cent at the end of 5 years. The tree has succeeded best in Great Britain on good deep soil and has thrived well of ground from which timber was just previously removed. It fails on stiff clay soils and on ground covered with dense matted grasses, rushes, etc. It does poorly on shallow soil over chalk. Slight evidence exists that the climate of eastern Great Britain is more congenial to the species than that of the western districts. In western Montana the larch grows closer together and has a more slender stem than European larch in Britain. Its volume and height is less in youth, but exceeds in height after 50 years and in volume after 70 years the European species. Larch was first introduced into Europe in 1881. The oldest trees are 42–47 feet high (apparently at age of 42–45 years). Only 1 has a straight stem; the others have curved stems, indicating sensitiveness to winds. Plantations and individual specimens of various ages on many sites do not in general give much promise or compare favorably with European and Japanese larch.—*C. R. Tillotson.*

2378. Hullah, J. **Quinquennial report of forest administration in British India for the period 1914–15 to 1918–19 to which is appended the annual return of forest statistics for the year 1918–19.** *11–28.* Simla. 1920.—This is a general summary of the work of the forest departments of British India for the 5-year period of the great war. Forest acreage, surveying, engineering, fire protection, grazing, planting, felling operations, income, forest entomology, and personnel are among the important subjects discussed. Planting progress in taungya plantations was made. Great progress in studies of regeneration of sal and deodar is reported. Graphic representation of some of the more important facts in the report is a valuable feature.—*S. B. Show.*

2379. Jacob, W. R. Leg. **Report on forest administration in the Andamans for the year 1919–20.** *iii + 41 p.* Calcutta, 1921.—Cutting of climbers in young stands was done on 2680 acres. The plantations, chiefly of teak and mahogany, have been tended; the area is now 4299 acres. The report includes the usual detailed tabulations showing areas, railway construction, output, receipts, expenditures, etc. In striking contrast to the other Indian provinces there were no forest fires and no unlawful fellings. A general abstract, such as is included in most Indian reports of similar nature, is not given.—*S. B. Show.*

2380. Kautz. **Die Verjüngung und Pflege der Buchen- und Fichtenhoch-waldbestände im Schmalschlagbetriebe in der Oberförsterei Sieber (Harz). [The regeneration and care of beech and Norway spruce highforest stands in small cutting operations in the Sieber forest range (Hartz Mountains).]** Zeitschr. Forst.- u. Jagdw. 53: 348–406. *Fig. 1–13.* 1921.—The author discusses intensively past experience in regenerating beech and the present practice of securing beech regeneration under the small shelterwood-strip system; the care of pure beech stands by carefully conducted cleanings and thinnings, which retain the vigor of healthy reproduction; the proper conducting of thinnings in pole stands (40–80 years old); the regeneration and care of pure Norway spruce high-forest stands, also of mixed stands of beech and spruce; protection against destructive agents; and the relation of the small area operation to the continuous management systems, which include all systems which at no time leave the forest floor unstocked. The small area cutting system as compared with extensive

area and clear-cut systems strives mainly to secure better protection of the forest soil and reproduction against such dangers which are caused by logging and removal of the timber from forests.—*J. Roeser, Jr.*

2381. Koehler, Arthur. **The identification of true mahogany, certain so-called mahoganies, and some common substitutes.** U. S. Dept. Agric. Bull. 1050. *18 p., 13 fig.* 1922.—A key is given for the identification of the woods of true maghoganies (*Swietenia* spp.), "African mahogany" (*Khaya* spp.), "Philippine mahogany" (*Shorea* spp.), and others, as well as *Betula lenta, B. lutea,* and *Liquidambar styraciflua,* the common substitutes. The woods, trade and commn names, and sources of the various species are described, and a glossary of terms is given. The figures are photographs of the grain of various woods, magnified 7.5 diameters.—*J. Lincoln Cartledge.*

2382. Lee of Fareham, and G. G. Levenson Gower. **The ninety-eighth report of the commissioners of H. M. Woods, forests and land revenues, for the year ending March 31, 1920.** *57 p.,* H. M. Stationery Office: London, 1920.—The total income for the year was £ 1,156,790, of which £ 128,187 was from timber, the balance from agricultural and house properties, mines, interest, etc. The expenditures were £ 477,859 of which £ 108,421 was for planting, cultural operations, etc. In accordance with various acts of Parliament, expenditures, incomes, leases, rents, etc., are given in great detail.—*S. B. Show.*

2383. Lent. **Forstdüngungsversuche im Regierungsbezirk Sigmaringen.** [Experiments in forest fertilizing in the government district Sigmaringen.] Mitteil. Deutsch. Landw. Ges. **37:** 663-666. 1922.—This work was started in 1905, when the first plantings were made. Eleven treatments were tried including checks, all duplicated except 1 check plot and 1 plot to which 2000 pounds of calcium were applied. The tests included the turning under of 1 crop of alsike clover, the application of lime, phosphates, potash, and ammonia. To determine the effect of the treatments, the height of the trees (spruce) and the length of the terminal growth were measured every year from 1906 to 1920. Further height measurement was rendered impossible by the height of the trees; in 1922, the diameters at breast height were measured for every 3rd row. The results all pointed to the great value of phosphate fertilizers, but a comparison of growth in different years brought out the fact that growth was influenced by temperature and moisture more than by fertilizers.—*A. J. Pieters.*

2384. Mattoon, Wilbur R. **Longleaf pine.** U. S. Dept. Agric. Bull. 1061. *50 p., 22 pl.* 1922.—A comprehensive discussion is presented of *Pinus palustris,* its range and importance, its second growth, rate of growth on various lands and under fire protection, and production of timber for cross-ties, cord-wood, and saw-timber. Various methods of turpentining and its effect on growth are described. Methods of reforestation, sowing and planting, protection against fire, hogs, insects, diseases, and other injuries are considered.—*J. T. Buchholz.*

2385. Maxwell, Herbert. **Defoliation of oaks.** Nature **110:** 344. 1922.—The British oak (*Quercus robur* L.) has 2 distinct races, regarded by some botanists as distinct species (*Q. pedunculata* Ehrh. and *Q. sessiliflora* Salisb.). The latter, known as durmast oak, is the commonest indigenous form in western and northwestern Great Britain. It rarely ripens fruit, hence is less common in plantations, but is distinctly less susceptible to damage by *Tortrix.* The timber of the 2 forms is of equal quality.—*O. A. Stevens.*

2386. Millischer,. **Sur l'enrésinement.** [Concerning the conversion of hardwood into coniferous forest.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **14:** 320–332. 1922.—A discussion is given of the transformation of hardwood coppice into coniferous high forest of fir. The retention of a mixture of beech, ash, and maple with the fir is desirable to the extent of 10-50 per cent depending on the needs of the community for firewood. The conversion should increase the owner's revenue 10 fold, and should be made wherever there is

a deep soil, north exposure, humid climate, with regular and abundant precipitation, and elevation from 500 to 1,000 m. The natural method is to take advantage of seedlings from neighboring seed trees which should be disengaged of the coppice at intervals of 10 or 15 years. The other method is by planting the fir after making a reproduction cutting in the hardwoods. Fir can be introduced by sowing or by planting, the latter in the autumn. Disengagement cuttings repeated every 5 or 10 years are indispensable to the success of the fir.—*J. Kittredge, Jr.*

2387. Milward, H. G. **Annual progress report of forest administration in the United Provinces for the forest year 1918-19.** *8 + 38 + cxvii + 7 p.* Allahabad. 1919.—This annual report covers in detail the various phases of the forest work. It considers the forest area, income, utilization, reforestation offenses, fire protection, grazing, and forest income. Insect damage to sal, and to chir pine following fire, is noted. A brief review of the 5-year period 1914–15 to 1918–19 shows as outstanding features the increase in area of reserved forest from 5,410 to 7473 square miles, the great investment in utilization improvement projects, the increase of forest offenses from 2997 to 4421, increase in output of timber and fuel from 20,105,000 to 26,355,000 cubic feet, the great increase in income, already noted, and the excellent success in afforestation of denuded areas on over 3000 acres. A review by the Secretary to Government is a valuable feature of the report.—*S. B. Show.*

2388. Monnin. **Sur la qualification des bois.** [**Concerning the qualifications of woods for different uses.**] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **14**: 347–357. *Fig. 1–11.* 1922.—Descriptions and illustrations are given of the wood structure of European fir, American spruce, white pine, mahogany, red birch, black walnut, ash, and oak. Methods of determining the coefficient of elasticity, the modulus of rupture, and resistance to shock are given. A table compares the characteristics of fir, spruce, and larch woods (all from the same station in the Alps) as to appearance, shrinkage, moisture content, specific gravity, compression, bending, resistance to shock, and transverse shearing.—*J. Kittredge, Jr.*

2389. Osmaston, B. B. **Report on the forest administration of the Central Provinces (India) for the year 1919–20. I. The report.** *7 + 32 p.* **II. Statistical statements.** *lxiii p.* Nagpur, 1921.—The annual summary of the work of the Forest Department shows there was no change of consequence in the constitution of State forests, which cover ⅕ of the area of the province. Among the important subjects considered are boundary surveys, forest offenses, working plans, road construction, forest fires, planting, grazing, forest utilization, and forest income. Taungya plantations total 7946 acres. Collection and revenues from lac are discussed. Revised scales of pay for subordinates were put into effect. The personnel, especially in the higher grades, is felt to be inadequate. Part II of the report summarizes in detail the various phases of the work of the Department. A summary by the Revenue Secretary precedes the Conservator's report.—*S. B. Show.*

2390. Paerels, J. J. **Cocoa-cultuur op Java.** [**Coca growing in Java.**] Cultura **34**: 328–330. 1922.—*Erythroxylon coca*, the Peru coca, and *E. novagranatense*, the Java coca, are considered. The latter grows from sea level to an elevation of 1000 m. and more. A moist climate is beneficial for leaf production. The seed lose their germinating capacity within 2–3 weeks. Seed treatment and nursery practices are discussed. Coca is also grown as a secondary crop, especially between coffee and *Hevea*. The first harvest of leaves takes place when the trees are pruned to a height of 1 foot. When plants are 3-3½ feet high they are cut back to a height of 2–2½ feet.—When leaves are harvested they are spread out to prevent fermentation. The more quickly the leaves are dried or the lower the temperature, the less the alkaloid is decomposed. When picked in early morning, they should be dried the same day. Leaves are also dried artificially. After drying they are pulverized and packed. In Java 600–750 kgm. per bouw (=0.70 hectare) are produced. Most of the crop is sent to Amsterdam (265.000–910.000 kgm. yearly). Some is sent to the U. S. A.—*J. C. Th. Uphof.*

2391. Parnell, R. **Progress report on forest administration in the Northwest Frontier Province for the year 1919–20.** *2 + 2 + 15 + xxviii p.* Peshawar Cantonment, 1920.—The

area of reserved forests has remained constant at 159,925 acres, and protected forests at 77,519 acres. Forest working plans, forest offenses, protection, reforestation, improvement cuttings, felling operations, forest products, forest income, and forest expenditures are among the important subjects discussed. Deodar appears to compete unsuccessfully with blue pine, the regeneration of which, as well as of chil pine, is excellent.—The question of reorganization of the Forest Department is still unsettled. The customary detailed tabulations covering all phases of the work of the Department are included in the report, and reviews by the Revenue Secretary and the Inspector-General of Forests are valuable features.—*S. B. Show.*

2392. Record, Samuel J. **Notes on woods.** Science 55: 266-269. 1922.—West Indian boxwood may refer to wood from (1) *Aspidosperma Vargasii* DC., the first on the market, now largely replaced by (2) *Casearia praecox* Griseb.; and (3) *Phyllostylon brasiliensis* Capanema (=*P. rhamnoides* Taubert = *Samaroceltis rhamnoides* Poisson), the wood of which is of inferior quality. It is often stated incorrectly that West Indian boxwood comes from *Tabebuia* (*Tecoma*) *pentaphylla* B. & H. f. Brazilian tulipwood is supplied by *Physocalymma scaberrimum* Pohl. Coffeewood for umbrella handles comes from Venezuela and the best evidence points to *Caesalpinia Ebano* Karst. as its source. "Rosewood" covers several different woods, so named from color or scent. Surinam rosewood, or "rozenhout," the source of an essential oil, is established as *Aniba* sp. (near *A. panurensis* Mez.). True Brazilian rosewood is *Dalbergia nigra* Fr. All. and trade varieties are based on color variations only. Honduras "rosewood," the best for xylophone bars, has not been identified beyond being one of the Leguminosae, possibly a Dalbergia. Cocobolo, used for knife handles, comes from several countries. In Panama it is from *Dalbergia retusa* Hemsley, in Nicaragua from *D. hypoleuca* Pittier in ed., while the wood from Mexico is probably from a new species. "Redwood" of Panama is *Platymiscium dubium* Pittier; of Brazil it is *Brosimum paraense* Huber. The latter promises to be much like, if not identical with, "satiné" of French Guiana which has been named *Ferolia guianensis*. Kakatara-balli, a dull-white wood of British Guiana, seems to be from some species of *Ilex*.—*C. J. Lyon.*

2393. Trafford, F. **Annual progress report on forest administration in the province of Bihar and Orissa for the year 1918-19 with a summary of progress during five years 1914-15 to 1918-19.** *69 + 5 p.* Patna, 1919.—This report considers forest area, offenses, protection, grazing, planting, timber sales, and forest income. Teak and casuarina plantations were increased somewhat, and taungya plantations are promising. A good seed year is reported for sal though regeneration was retarded by evergreen undergrowth. The summary for the 5-year period ending with the year under report shows considerable progress in reorganization of the department; the personnel is inadequate, otherwise the record is one of fairly steady progress, with the financial results particularly striking. A review of the report by the Secretary to Government and a map of the province are valuable features of the report.—*S. B. Show.*

2394. Trafford, F. **Progress report of the forest administration in the Province of Assam for the year 1920-21.** *15 + 49 + 2 p.* Shillong, 1921.—Since the forest year is being made to coincide with the fiscal year, this report covers a 9-month period in the work of the forest department. A good seed crop of sal and other important species is reported. Experiments in natural regeneration of sal by a combination of fire and grazing were inconclusive, but similar studies in the evergreen forests of the east promise success. Taungya plantations of sal were made on a minor scale. An area of 13,084 acres of sal forests was worked under improvement fellings. The report considers gross and net yields of different operations, areas, construction work, offenses, fires, fire protection, personnel, expenditures, etc. A valuable summary of the more important features of the year's work, prepared by the Revenue Secretary to Government, is given. M. A. W. Blunt, one of the veterans in the service, and formerly conservator of the western circle, has retired from active service.—*S. B. Show.*

2395. Trebeljahr. **Die taxatorische Behandlung von Mischbeständen.** [Management of mixed stands.] Zeitschr. Forst- u. Jagdw. 63: 616-626. 1921.—In this reply to Denzin's article [see Bot. Absts. 11, Entry 2354], Trebeljahr contends that the division of mixed stands into distinct working sections by species is theoretical, impracticable, and complicates the plan. In mixed stands the division into regular working sections should be based on the age classes and rotation period of the principal tree; and all species should fall into one working section. Continuity of management is dependent upon such age class division. The new arrangement does not entail more bookkeeping. The management plan is not a statistical work, which Denzin claims as an advantage of the former system.—*J. Roeser, Jr.*

2396. Trebeljahr. **Kieferndauerwaldwirtschaft.** [Continuous forest management in pine.] Zeitschr. Forst- u. Jagdw. 53: 286-294. 1921.—This article constitutes another chapter in the dispute between Möller and Trebeljahr in which the latter replies to Möller's article [see Bot. Absts. 11, Entry 2394]. Trebeljahr is opposed to the continuous management system in pine as practiced at Bärenthoren for he regards it as impractical when applied in extensive state forest operations. Leaving the litter on the soil undoubtedly raises the site quality, but Trebeljahr contends that this is not a characteristic of the continuous management system. Since the author is a soil-rental theorist he does not support Möller's authorities, such as Fricke, von Hagen and Borggreves; he analyses the latter's formula and shows that it is untenable since it does not consider intermediate yields.—*J. Roeser, Jr.*

2397. U. **Die Zukunft der Jugoslawischen Wälder.** [The future of Jugoslavian forests.] Wien. Allg. Forst u. Jagd Zeitg. 40: 141-142. 1922.—The author covers the legal rather than silvicultural aspects and criticizes certain governmental forest regulations and presents systems of taxation as fostering short-sighted policies.—*F. S. Baker.*

2398. Weber, Heinrich. **Grundlinien einer neuen Forstwirtschaftsphilosophie.** [Foundations of a new philosophy of forestry.] *116 p.* Tübingen, 1919.—Part I deals with laying the foundations of forestry science. In this the author attempts to analyze and answer 3 questions: What is science in general? What is the object of forestry science? What is forestry science? Part II deals with the system of forestry science, both in its immediate and in its historical development. Part III deals with the methodology of forestry science (research methods), both in its present status and in its historical development. Weber's system of forestry science is built upon human consciousness itself. The end products of thought, volition, and feeling, which constitute consciousness, are respectively the natural (both mathematical and biological) sciences, the volitional or sociological sciences, and the sciences underlying the arts. Each works with its own methods; by means of logic, ethics, and aesthetics respectively. These 3 together with psychology may be said to constitute the main body of philosophical thought. The natural sciences include mathematics, physics, chemistry, botany, zoology, meteorology, climatology, geology, etc.; the volitional sciences include political science, sociological science, and economics; the so-called art sciences are included in the term "forest aesthetics." Forestry science presents 3 main aspects—the fundamental aspect, meaning the fundamental sciences, the norm of forest production, and lastly forest practice. The norm is built upon the fundamental sciences, and upon the norm is built forestry practice. The latter, reciprocally, has a controlling effect upon the norm. The norm is considered the keystone of the entire philosophical structure.—*Richard H. D. Boerker.*

2399. Witt, D. O. **Annual progress report on forest administration in the Province of Bihar and Orissa for the year 1919-20.** *59 + 3 p.* Patna, 1920.—Details of the work of the forest department are covered. The report discusses forest area, offenses, fire protection, working plans, land acquisition, cooperative work, and forest income. A review by the Secretary to Government is a valuable feature of the report.—*S. B. Show.*

GENETICS

Orland E. White, *Editor*

(See also in this issue Entries 2229, 2239, 2253, 2262, 2286, 2480, 2482, 2486, 2492, 2501, 2505, 2507, 2514, 2515, 2547, 2561, 2626, 2665, 2845, 2848, 2857, 2861)

2400. Anonymous. **Hybrid Nymphaeas.** Missouri Bot. Gard. Bull. **10**: 127–131. *Pl. 18–20.* 1922.—Water lilies have been cultivated since 3000 B. C. Schweinfurth studied specimens from funeral wreaths of Rameses II in comparison with the white nocturnal (night-blooming) *N. Lotus*. It is concluded that species have not noticeably changed in 4000 years. All tropical diurnal (day-blooming) water lilies are colored, excepting *N. gracilis* from Mexico. The African species *N. ovalifolia* has white petals tipped with blue and pink. White is not recessive in crosses. *N. ovalifolia* in crosses segregates its type in F_2. *N. gracilis* in crosses does not segregate that type.—The cross *N. ovalifolia* × *N.* "Mrs. Edwards Whitaker" and the reciprocal cross were made. The cross with *N. ovalifolia* as seed parent produced both albinos and "Whitaker." Selection fixed the dominant albino character in 3 years' self pollination. Self pollinated "Whitaker" yielded a light campanula-blue type also produced as a hybrid from *N. castaliiflora* × *N. castaliiflora*. Another hybrid of uncertain parentage is described. Trade designations are used in the discussion.—*J. Ben Hill.*

2401. Anonymous. **Nocturnal hybrid water-lilies of the late James Gurney.** Missouri Bot. Gard. Bull. **10**: 147–150. *Pl. 24–26.* 1922.—Seven nocturnal (night-blooming) hybrid water-lilies, the result of work of the late James Gurney, are described. Parentage is uncertain in all cases, 2 species, *Nymphaea Lotus* and *N. rubra*, comprising the original stock. Selections were made of promising hybrid seedlings. One hybrid derived from parents of the lotus type was both nocturnal and diurnal (day-blooming) indicating the possibility of obtaining diurnal segregates from nocturnal types.—*J. Ben Hill.*

2402. Anonymous. **The present position of Darwinism.** Nature **110**: 751–753. 1922.—In this summary of the discussion at the joint meeting of the botany and zoology sections of the British Association for the Advancement of Science, natural selection is attacked by J. C. Willis from the geographical distribution point of view and by Udny Yule from the results of statistical analysis. It is contended that no proof exists for the mechanisms Darwin assumed to account for natural selection; also that the hypothesis of "age and area" and "size and space" offer a better explanation of geographical distribution and evolution than does natural selection. Distribution is regarded as a question of dispersal and time acting at a uniform rate. Willis regards large mutations of greatest importance in evolution.—Yule discusses statistically the theory of "age, size, and space." Genera "throw" species whose numbers increase in geometrical ration with time. J. Stanley Gardiner approves the thesis of "age and area." C. Tate Regan criticizes the statistical work of Yule and Willis claiming Darwin's work had stood the test. Chalmers Mitchell considers that Willis has presented merely a caricature of natural selection. H. Wager dismisses fluctuating variations as of no evolutionary value but says mutations need not be large. He directs attention to an alternate title for "origin of species," namely, "preservation of favored races."—A. C. Seward criticizes "age and area" theory pointing out that conifers and ferns in restricted areas are the oldest forms. E. B. Poulton states that in African butterflies the younger form has a greater distribution than its ancestral type. A. B. Rendle considers multiplication of forms in geometrical progression unlikely in limited space. He regards as difficult the differentiation between useful and useless characters. R. Ruggles Gates emphasizes the importance of extinction of forms as an evolutionary factor. Julian Huxley states that in the Gipsy moth apparently useless characters are correlated with physiological differences harmonizing with environment.—W. Johannsen thinks that most geneticists are agnostics as to the mechanism of evolution. W. J. Dakin believes the faculty of evolution is a character of organisms as are irritability and reproduction. J. Stanley Gardiner agrees that evolution is an inherent property of protoplasm.—*J. Ben Hill.*

2403. Anonymous. **Testing of new varieties of the potato for immunity from wart disease.** Scottish Jour. Agric. 5: 306–311. 1922.—Samples of potatoes to be tested were first sprouted in boxes, and tubers with sprouts differing in color from the bulk of the sample were discarded. Observations were made to determine trueness to variety and to detect the occurrence of diseases other than wart, notably blight, corky scab, mosaic, and leaf-roll. Samples of new varieties of potatoes are tested for at least 2 seasons, and if they satisfactorily pass the trials a certificate for immunity to wart is granted. Of the 80 American varieties under test, 18 named sorts and 3 seedlings were immune, and 3 additional seedlings were doubtfully immune. The immune varieties comprise 10 types as follows: Irish Cobbler (4), Early Harvest, Ehnola, Perfect Peachblow, Early Manistee, Green Mountain (6), Netted Gem, Keeper, Northern King, M'Cormick. Of 22 varieties from Germany, 4 proved to be immune. A synopsis of the American Report on British Varieties Sent to the United States in 1920 is given as well as a brief note on the German Report on British Varieties.—*J. A. Faris.*

2404. Anonymous. **Wart disease of potato immunity trials.** Gard. Chron. 72: 229. 1922.—Additional facts regarding immunity trials at the testing station of the Scottish Board of Agriculture are given [see preceding entry]. Tests are made with single tubers and also with 6 tubers of each kind. In the single tuber tests numbers of pedigree seedlings of both immune and non-immune varieties were included to obtain knowledge of the probable percentage of immune types which might be expected in either case. Selfed immune varieties produced a large number of immune seedlings. Crossing a non-immune with an immune variety (President × Flourball) showed about 40 per cent of immune individuals after 2-years' test, but crossing 2 immunes (Majestic × Flourball) gave a percentage of 70–80 of immunes.—*J. A. Faris.*

2405. Auchter, E. C. **Apple pollen and pollination studies in Maryland.** Proc. Amer. Soc. Hort. Sci. 18: 51-80. 1921 [1922].—Sterility tests made in 1919 and 1920 of 66 varieties of apples showed that 45 were self-sterile, 12 self-fertile, and 9 partially self-fertile.—In 1919 approximately 1000 blossoms (in 1920, 500) of each variety, in the pink stage, were inclosed in manila sacks. Sacks were removed after flowering was over and a record made of fruits; this record was repeated after the "June drop." In all cases 1000 unbagged blossoms were counted to serve as a check and to indicate the "normal set." Removing bags and brushing the stigmas did not increase set of fruit in 4 self-fertile varieties, nor did it cause setting of fruit in self-sterile varieties. Bagging is, apparently, a safe method of testing self-sterility even though stigmas are not brushed. To insure cross-pollination, varieties should bloom at approximately the same time. Except for very early and very late blooming varieties there is sufficient overlapping of periods to permit cross-pollination. Blooming records for 107 varieties covering 1–8 years show that dates of bloom and length of periods vary in different years and are influenced by many factors; the average for a number of years is a safe index. Intersterility studies indicate that Stayman Winesap × Winesap and Stayman Winesap × Arkansas, as well as the reciprocals, are intersterile. Winesap and Arkansas are apparently intersterile. A test of Early Ripe, Red June, Red Astrachan, Oldenburg, and Bloomfield showed in general that early varieties are cross-fertile, although pollen of Oldenburg and Bloomfield used in Early Ripe failed.—Pollen from 19 varieties was used on Lawver; 15 varieties failed and 4 gave success, the percentages, ranging from 0.6 to 5.37, suggesting that cross-sterility may be more serious than supposed.—Slightly higher pollen germination percentages were secured in 10 than in 2, 5, and 15 per cent sugar solutions. Pollen of most varieties germinated equally well whether listed as self-fertile or as self-sterile. Stayman Winesap and Arkansas pollen gave practically no germination.—The set of fruit increased from nearly 2 to 5-fold when pollen from larger buds was used. Pollen from small buds did not germinate as soon or as well as did pollen from large buds. Pollination of large buds gave better set of fruit than pollination of small buds. Immediate pollination gave better results than delayed, especially in warm weather. The author concluded that pollen remains healthy and viable for long periods if kept dry and at proper temperature. Pollen can endure lower temperatures than pistils. Pollen from trees subjected to 20 and 22°F. when in bloom gave good percentage

germination, but germinated more slowly than normal pollens. Time of day is not important unless decided changes in weather have occurred.—*C. S. Crandall.*

2406. Babcock, E. B. **Bud selection and frequency of mutations.** Better Fruit 16[5]: 9–10. 1921.—There is little definite information regarding the frequency of bud mutations in varieties of deciduous fruits. Propagation from high-yielding trees is commended, but trees so propagated should not be offered as anything more than first class stock until it has been proved that the high-yielding character of the parent tree has been transmitted. The question as to whether yield of varieties of deciduous fruits can be increased through bud selection is still unanswered and data from careful experiments are needed. Bud mutations appear to be frequent in certain citrus varieties, but it should not be inferred that they occur with equal frequency in apples or other deciduous fruits. Deciduous varieties have arisen as bud mutations, but the number is small and it is fair to infer that mutations resulting in high productivity are rare. Experiments have been limited, but thus far have tended to increase doubt as to the practicability of increasing yield of standard deciduous varieties through bud selection. Advertising stock grown from high producers as insuring high-yielding orchards should be discouraged until results of definite experiments have proved to what extent trees thus propagated excel first-class nursery stock. Bud selection should be encouraged, but the practice does not warrant claims to unusual merits in nursery stock. Keeping performance records of orchard trees is commended.—*C. S. Crandall.*

2407. Banta, Arthur M., and L. A. Brown. **More eyeless Cladocera.** Amer. Nat. 56: 568–571. 1922.—In crowded cultures of daphnids 2 eyeless individuals have occurred in *Moina rectirostris* and 9 in *M. macrocopa*. All showed a reduced optic ganglion and some had abnormal antennae. Several thousand descendants of these 11 eyeless individuals together with some of their collaterals were raised but all were normal, thus showing that eyelessness was not transmitted. External factors are suggested as being responsible for these abnormalities.—*D. D. Whitney.*

2408. Bertaux, A. **Un cas d'hermaphrodisme androgynoide. [A case of androgynoid hermaphroditism.]** Bull. et Mem. Soc. Anat. Paris 1922: 93–94. 1922.—A child of 12 years, previously regarded as a girl, was operated upon for inguinal hernia when a testis was revealed in the canal of Nuck. A brother of 14 is normal as is also a sister of 3, except that the latter has a small strand of tissue bridging the urinary meatus.—*C. H. Danforth.*

2409. Blaringhem, L. **Hérédité anormale de la couleur des embryons d'une variété de pois (Pisum sativum L.). [Abnormal inheritance of the color of the embryo of a variety of garden pea.]** Compt. Rend. Acad. Sci. Paris 174: 877–879. 1922.—Some striking irregularities in the inheritance of embryo color in garden peas are reported. Some lines show the simple 3:1 segregation of yellow to green in the 2nd generation; but certain other strains give irregular ratios in which green is dominant to yellow [see Bot. Absts. 1, entries 1314, 1315]. Such irregular strains are affected by climate, nutrition, and maturity and furnish excellent material for the study of the effect of environmental conditions upon the expression of a character. Because of this reversal of dominance in peas it is necessary to resort to severe selection of lines in order to verify the original work of Mendel.—*H. C. McPhee.*

2410. Bluhm, Agnes. **Zur Erblichkeitsfrage des Kropfes. [The question of inheritance of goitre.]** Arch. Rass.- u. Gesellschaftsbiol. 14: 1–9. 1922.—In any study of goitre it is important to distinguish between endemic and sporadic cases. Endemic goitre it would seem may not be hereditary while sporadic forms commonly are. Since the manifestations of goitre are of varying degrees, it is necessary in any thorough-going study of heredity of the condition to examine not only the obviously goitrous members of a family but also those who may seem to be normal. Furthermore it is important to know where each individual has lived at each life period in order to determine the likelihood of endemic ('acquired') goitre. The author endeavors to present a family history which meets these requirements. The

progenitress, of Dutch descent on her father's side, probably had a slight goitre. Of 20 female descendants in 3 generations, 4 have obvious goitres (1 with Basedow's disease); 5, goitres apparent to a trained observer; and 5, goitres recognizable only by palpation or slight thickening of the neck. The remaining 6 either died in infancy or are too young to show the defect. It has not appeared in any male descendant though some have seemed to transmit it. The condition is definitely hereditary but none of the suggested hypotheses offered a satisfactory explanation of its mode of transmission. Nevertheless the author feels that despite its inherent difficulties the heredity of goitre furnishes a promising subject for study in the field of hereditary pathology.—*C. H. Danforth.*

2411. Bouget, Joseph. **Sur les variations de coloration des fleurs réalisées expérimentalement à haute altitude.** [**Upon variations in flower color experimentally secured at high altitude.**] Compt. Rend. Acad. Sci. Paris **175**: 900–901. 1922.—Experiments in plants at 2860 m. altitude have shown that the brilliant flower coloring of alpine plants is due to a high percentage of moisture in the atmosphere surrounding the plant and to the intensity of the sun-light reflected from the snow during the flowering period. Temperature had little effect on coloration. The diminution in light intensity resulted in less bright colors.—*J. L. Collins.*

2412. Caron, von. **Züchtung und Anbau deutscher kleberreicher Winterweizen und ihre Backfähigkeit.** [**Breeding and cultivation of German high-gluten winter wheats and their baking qualities.**] Beitr. Pflanzenzucht **5**: 158–168. *1 pl.* 1922.—In an attempt to make Germany less dependent on foreign countries for high-gluten wheat, breeding operations were begun in order to produce a new variety suitable both in yield and baking quality, present varieties being inadequate. Hybrids were made in 1911 between Nordstrand, a not very late ripening, northern-grown variety, and Saumur, an early ripening, high-gluten, spring variety from southern France. These 2 parents were morphologically similar, having small, lax, sometimes nodding spikes. This cross gave a squarehead form (thick, compact spike) with reddish-brown, glassy kernels. The dark reddish-brown form was constant to 1914, when reported. Analyses showed the protein content of 2 selections made as 18.08 and 18 per cent, while Nordstrand had 10.87 and Saumur 11.01 per cent. In gluten they were nearly equal to Manitoba wheat, the best foreign kind, and much superior to the ordinary German wheats. They ripen about 14 days earlier than Nordstrand, and a month earlier than the German squarehead wheat. The selections are apparently winter-hardy, as indicated by spreading growth, and not affected by loose smut. The kernels are larger than in the parents. A new hypothesis of inheritance is formulated in which the positive bio-electron of the protein gene of the new individual is lessened by the negative bio-electron of the protein genes of the father and mother, while the negative bio-electron of the protein gene of the new individual absorbs the positive bio-electrons of the parents. [A discussion follows on pages 169–170.] —*C. E. Leighty.*

2413. Coffman, F. A. **Pollination in alfalfa.** Bot. Gaz. **74**: 197–203. *Fig. 1–5.* 1922.—Pollination was studied with reference to 4 arbitrarily chosen stages in floral development: "straight bud" (5–6 mm. in length), "pointed bud" (6–10 mm.), "hooded bud," and "erect standard." It was found that the flowers begin to shed pollen in the pointed bud stage. Since in ordinary hybridizing work dependence is placed upon tripping in the hooded bud stage and subsequent removal of the pollen by washing, it is pointed out that no certainty may be gained that self-pollination has not taken place. The author states that emasculation earlier than the pointed bud stage is practically impossible.—*B. W. Wells.*

2414. Fetscher, R. **Über die Erblichkeit des angeborenen Klumpfusses.** [**Heredity of congenital clubfoot.**] Arch. Rass.- u. Gesellschaftsbiol. **14**: 39–52. 1922.—Clubfoot is found in about 1 case in 1,000, and commonly in the offspring of normal parents, which suggests that if hereditary it is recessive. That it is in fact hereditary is indicated by a study of 25 family groups. Data previously reported by Besselhangen showed that in the general run of cases 63.7 per cent are males and 36.3 per cent females. The author finds a similar distribution

(67.2 per cent male, 32.8 per cent female), but notes that there is a concomitant disturbance in the sex ratio since in the families studied there are 2 males to 1 female. It might appear from this that the actual incidence of clubfoot is the same for both sexes were it not that such an assumption seems to be precluded by the extensive data of Besselhangen. However, the observed departure from the normal sex ratio is significant and an attempt is made to explain the whole situation on the hypothesis of a special kind of non-disjunction resulting in 3 types of viable eggs. When fertilized by sperm from a heterozygous male such eggs would be expected to produce 3 males to 2 females and among the affected individuals 2 males to 1 female. These expectations agree fairly well with observations except that the actual number of offspring with clubfoot is too small, being, when both parents are heterozygous, about $\frac{2}{3}$ instead of $\frac{3}{4}$ of the children. This discrepancy could be explained by postulating 1 additional recessive factor or 2 dominant ones, which would reduce the expected cases to about the number observed. The author recognizes certain weaknesses in this (rather involved) hypothesis, which is presented merely as a tentative suggestion.—*C. H. Danforth.*

2415. Fraleur, J. L. **Mendelsche synthesisvormen bij de dieren. [Mendelian synthetic forms in animals.]** Genetica 4: 235–246. 1922.—The results of a series of hybridizing experiments with rabbits and the domestic fowl are reported. Phenotypes differing from the ordinary dominant and also from the intermediate F_1 forms can be of 2 classes: (1) an entirely new type, as the result of complementary factors; (2) a mosaic type, through a juxtaposition of 2 dominant characters, 1 of which is possessed by each of the parental types. In the F_2 a dihybrid of class 1 would give the following ratio: 9 N, 3 P, 3 P_1, 1 N_1. Crosses of hybrids carrying complementary factors (class 1) as well as those with factors in juxtaposition (class 2) produce corresponding numbers of genotypes in F_2.—*A. R. Saunders.*

2416. Freckmann, W. **Grassamenbau und Gräserzüchtung. [Grass-seed production and grass breeding.]** Beitr. Pflanzenzucht 5: 118–128. 1922.—This is a discussion (at plant-breeding conference in 1914) of the practical question of grass-seed production, and a plea for more breeding work on grasses and clovers. The need for better-yielding varieties of hay crops is pointed out, also the use of kinds best adapted to conditions, which would allow the production of sufficient forage on the present acreage of meadow and pasture land and yet maintain the present grain acreage. A discussion follows on pages 128–134.—*C. E. Leighty.*

2417. Garber, R. J. **Inheritance and yield with particular reference to rust resistance and panicle type in oats.** Minnesota Agric. Exp. Sta. Tech. Bull. 7. *62 p., 6 fig.* 1922.—A study was made in oat crosses of the inheritance of panicle type and pollen abortion in relation to host reaction to stem rust. A study was made also to determine the correlation between rust reaction and yield and between panicle type and yield. Crosses were made between 2 open-panicled pure lines of oats, Victory and Minota, which are susceptible to stem rust, and a side-panicled pure line, white Russian, which is resistant. The crosses and parents were grown in the field under artificially induced epidemic conditions. Rust resistance behaved as a dominant character depending on 1 main genetic factor for its expression. In the F_2 generation of both crosses, Minota-White Russian and Victory-White Russian, there were 2,340 resistant and 704 susceptible plants. Of 377 F_3 families tested, 106 bred true for resistance, 175 segregated in the ratio 3 resistant to 1 susceptible, and 96 bred true for susceptibility. The F_1 plants are open-panicled but not to the same degree as the open-panicled parents. Of the 377 F_3 families tested, 98 bred true for open panicle, 213 showed segregation, and 66 bred true for side panicle. Rust reaction and panicle type are nearly, if not completely, independent in their inheritance. The Victory parent produced 12.4 per cent aborted pollen. Minota and White Russian produced 1.0 and 0.9 per cent aborted pollen, respectively. Of 250 F_2 plants in the Victory-White Russian cross, 7 produced percentages of aborted pollen within the range exhibited by the Victory parent. In the F_2 generation of the Minota-White Russian cross, rust infection caused a reduction in yield of 12 per cent in the open-panicled plants and 34 per cent among the side-panicled plants; and in the Victory-White Russian cross, 37 per cent among the open-panicled plants and 24 per cent in the side-panicled plants. In the F_3

generation the average percentages of reduction of yield as a result of infection with stem rust were 24, 14, and 37, 30 in the 2 crosses, respectively. In the Victory-White Russian cross the average yield per plant for the resistant forms was 16 per cent greater for the open-panicled types than for the side-panicled types; and for the susceptible forms the yield was 15 per cent greater for the side-panicled types. In the Minota-White Russian cross the average yield in the resistant forms was 14 per cent greater for the open-panicled than for the side-panicled types; and for the susceptible types the open-panicled forms yielded 25 per cent more than the side-panicled forms.—*Fred Griffee.*

2418. Garber, R. J. **Origin of false wild oats.** Jour. Heredity 13: 40–48. 1922.—The appearance of false wild oats in cultivated varieties of *Avena sativa* and *A. orientalis* has been explained by Nilsson-Ehle on the basis of loss-mutation and by Tschermak and Zade on the basis of natural crossing. False wild oats were found at University Farm, St. Paul, in 3 cultivated varieties of oats, Victory, Aurora, and Garton 784. The false wild oats in Victory were found in a plant row seeded from a panicle selected the previous year as typical Victory. The false wild plants differed from Victory only in respect to awn development, articulation of seed, and pubescence, and on the basis of these characters homozygous false wild, heterozygous false wild, and Victory plants were distinguished from one another. Victory types and homozygous false Victory bred true. The heterozygous false Victory gave 54 Victory types, 163 heterozygous false wild, and 80 homozygous false Victory. The false wild oats found in Garton 784 behaved similarly to those found in Victory. Homozygous false Garton 784 and homozygous Garton 784 bred true. The heterozygous false Garton 784 gave 81 Garton 784, 122 heterozygous false Garton 784, and 55 homozygous false Garton 784. Summing the results of the Victory and Garton 784, the progeny of the heterozygous false wild types approximates very closely a 1:2:1 ratio.—The false wild oats found in Aurora have the same characteristics of the Aurora except in awn development, articulation of seed, and pubescence.—Crosses between Garton 748, a variety very similar to Garton 784, and wild oats segregated for other characters than awn development, articulation of seed, and pubescence. The controlled crosses of cultivated varieties with the wild oats segregate for other characters than the awn development, articulation of seed, and pubescence, and that these latter characters are due to 1 main genetic factor is taken as evidence against the explanation of the appearance of false wild oats as due to natural crossing and in favor of the view of mutation.—*Fred Griffee.*

2419. Gates, R. R. **Interspecific sterility.** Nature 110: 179–180. 1922.—Bateson [Nature 110: 76. 1922.] lays insufficient emphasis on certain facts. Considering organisms in general interspecific sterility appears not so general as was formerly assumed. Among animals it is more widespread. The case of *Drosophila melanogaster* × *D. simulans*, which gives sterile hybrids although the 2 are similar and have similar chromosome groups, corresponds exactly with Bateson's conception of interspecific sterility. But it is an extreme case.—While agreeing that tetraploids frequently do not breed freely with diploids, Bateson regards the applicability of such an example doubtful because a tetraploid must be considered "an unresolved pair of twins," hence not a "specifically distinct organism." Bateson scarcely recognizes the intimate nature of the union involved. This union in *Oenothera gigas* not only increases cell size but alters cell shapes. Genetic behavior of *O. gigas* indicates some change in germ plasm in addition to chromosome doubling. This is shown by comparing *O. gigas* with Winckler's *Solanum* tetraploids, obtained by grafting; the latter are merely stouter without alteration in shape of parts or organs.—Wide occurrence and evolutionary significance of tetraploid species is not generally recognized. Tetraploidy bars free crossing with diploid forms in any line of descent. Tetraploid forms may be regarded as mutations significantly accompanied by partial interspecific sterility. The cross-breds with unbalanced chromosome groups tend to be eliminated, while each pure form perpetuates itself.—*E. B. Babcock.*

2420. Griffith, C. R. **Are permanent disturbances of equilibration inherited?** Science 56: 676–678. 1922.—White rats were horizontally rotated day and night, 60–90 times a minute, for several months. Some weeks after removal there appeared circular movements of the body

and twistings of the head, and some died from an affection of the ear. When mated, some of the progeny, which had never been rotated, showed symptoms of the same kind. Further investigations with a new stock are in progress.—*John Belling.*

2421. Guyer, M. F. [Rev. of: Newman, H. H. **Readings in evolution, genetics and eugenics.** *xviii* + *523 p.* Univ. of Chicago Press: Chicago, 1921.] Science **56**: 451. 1922.—Presentation in a single text book of materials necessary to be gleaned from numerous volumes. The book is not a patchwork but surprisingly unified. Minor mistatements and contradictions in former separate treatises are reduced to a minimum. A glossary of scientific terms is needed. For courses in evolution, variation should be given before or along with causal factors of organic evolution. Evidences from morphology would be better presented before those from paleontology. Chapters on neo-Mendelian heredity, sex-linked and other kinds of linked inheritance, and linkage and crossing-over are too difficult for the beginning student. "For the general student this is the most complete and acceptable one-volume account of organic evolution and allied subjects in print."—*D. F. Jones.*

2422. Hanisch. Tätigkeitsbericht der Pflanzenzuchtstation Ung.-Brod. [Accomplishments of the plant breeding station of Broder, Hungary.] Wien. Landw. Zeitg. **72**: 95–96. 1922.—A winter hardy rye ripening 6–8 days earlier than the parents was selected out of a cross, Hanna × Blue Petkuser. The hybrid possesses other desirable commercial qualities. Several crosses with summer barley are described, and types which are superior in adaptability to heavy soils and freedom from lodging are being selected. In pea-hybridization studies, one of the objects is to secure resistance to black aphis, one of the most serious enemies of pea culture. Potato breeding and variety testing studies are in progress, the object being to find varieties better adapted to Hungary's heavy soils.—*F. Weiss.*

2423. Harland, S. C. **Inheritance in Ricinus communis L.** Jour. Genetics **12**: 251–253. 1922.—Further data are presented on the segregation of factors in the castor-oil bean [see Bot. Absts. 1, Entries 249; 2, Entries 939, 952]. By back-crossing, factors *M* (mahogany) and *B* (bloom) were found to be linked and factors *G* (green) and *B* and also *M* and *G* to be independently inherited. No repulsion was found between factors *S* (spines) and *G* although more data are necessary to establish this point.—*Richard Wellington.*

2424. Harris, G. W. **Inheritance of a cheek-mole.** Nature **109**: 78. 1922.—A man with a mole on the middle of the left cheek has 2 daughters with similar moles in almost exactly the same place. His sons do not have cheek moles but a daughter of one of them shows the trait.—*C. H. Danforth.*

2425. Harrison, J. W. H. **Interspecific sterility.** Nature **110**: 312. 1922.—*Salix* spp. are discussed.—*O. A. Stevens.*

2426. Hayes, H. K., and H. D. Barker. **The effects of self-fertilization in timothy.** Jour. Amer. Soc. Agron. **14**: 289–293. 1922.—Self-fertilized clonal lines of timothy differed widely. This was probably due to genetic causes as there was marked correlation between the percentage of seed set under various conditions. Five out of 11 first-year, self-fertilized strains gave some albino seedlings in their progeny.—*F. M. Schertz.*

2427. Hubbs, Carl L. **Variations in the number of vertebrae and other meristic characters of fishes correlated with the temperature of water during development.** Amer. Nat. **56**: 360–372. 1922.—This work parallels that of Johannes Schmidt [see Bot. Absts. 11, Entry 314]. The work of both indicates "that the meristic characters displayed by an individual fish are determined not alone by heredity, but in part also by the environmental conditions, particularly temperature, which prevail during some sensitive developmental period."—*Robert K. Nabours.*

2428. Hurst, C. C. **Origin of the moss rose.** Rept. British Assoc. Adv. Sci. **1921:** 453. 1921.—The rose differs from the old Cabbage Rose only in its glands, yet 12 authors give it specific rank. Sterility makes genetic investigation difficult, but bud variation seems to throw light on constitution.—*E. B. Babcock.*

2429. Jack, H. W. **Selection of coconuts.** Malayan Agric. Jour. **10:** 122-127. 1922.—Selection of coconuts for planting is very desirable, as for instance among 453 12-year-old trees under observation individuals have varied in yield from 7 to 180 nuts per annum. Preliminary observations indicate that at least 10 per cent of the progeny do not come true to type. Races are characterized by the amount of copra yielded, but this falls off in age. Selection for planting by character of the nut must yield to selection by tree; and of all tall races, those with large nuts appear unacceptable, because the races possessing them produce few nuts; also races with oblong nuts seems to yield relatively less copra than medium-sized rounded nuts. But much work is needed. Whether any dwarf race can be held more desirable for planting than tall races is unsettled.—It appears that the nature of the oil varies too little between races to be worth using in selection.—*I. H. Burkill.*

2430. Jack, H. W., and W. N. Sands. **The dwarf coconut in Malaya.** Malayan Agric. Jour. **10:** 4–12. 1922.—The dwarf coconut, or in Malay, Nyior Gading, is evidently exotic to the Malay Peninsula and may have been imported first about 30 years ago from the Netherlands Indies. It is different from the King coconut of Ceylon, which race approaches the "nyior puyoh" of the Peninsula. The authors compare "nyior gading" with the King coconut and the "Coco Mino," a dwarf coconut of the Philippine Islands. The authors look upon all these dwarfs as mutants.—"Nyior gading" contains several races distinguished by the color of the nut, 3 of which are described. "It is quite evident that natural crossing takes place between tall and dwarf races so that semi-talls . . . . occur." Careful breeding experiments only can determine the relation of the factor of dwarfness to tallness; but the dwarf is said to give 80 per cent true to type in color of the nut, etc.—In an experiment with 1,270 seednuts, 96.2 per cent came true ivory-yellow dwarf, 68.7 per cent came green dwarf and 74.6 per cent true red dwarf, the flowers giving the nuts having been left to natural pollination.—"In the warm humid atmosphere of the lowlands of Malaya, the length of the duration of the male phase of the flowering palm is curtailed and the female phase would appear to be longer both in tall and dwarf races;" further "in Malaya the female phase not only begins, but most frequently ends before, or at the same time, as the male phase, thus rendering self-pollination the rule." The average duration of the male phase of the dwarf coconut was found to be 21 days and of the female 8 days [misprinted 3 in one place]. There are on the average 4-day intervals between the end of one phase of the tree and the beginning of the next phase, i.e,, in the sequence of inflorescences. The end of the female phase in 43 inflorescences was never more than 3 days behind the end of the male phase, when pollen might still function from the dead male flowers. The pollen is wind-borne, but the authors conclude that "the flowers are as a rule self pollinated in the lowlands of Malaya." [It would appear that they mean from one flower in the inflorescence to any other as readily as to itself.]—*I. H. Burkill.*

2431. Jones, D. F. **The productiveness of single and double first generation corn hybrids.** Jour. Amer. Soc. Agron. **14:** 241–252. 1922.—A general summary is presented of the relative yields of local varieties, inbred strains, single crosses and double crosses (crosses between 2 F_1 single crosses) of maize in Connecticut. With few exceptions the double crosses outyield the other classes but the fact is appreciated that the production of such seed at a cost low enough to be an important factor in corn growing remains to be demonstrated.—*J. H. Kempton.*

2432. Keith, Arthur. **The stature of the Scottish people.** Nature **110:** 8. 1922.—This article quotes a letter from Aleš Hrdlička of the United States National Museum, stating that, through an error of computation, the stature of the Scottish people as given in the Final Report of the Anthropometric Committee of the British Association (1883) is too high. The corrected heights are: Scottish, 172.9 cm.; Irish, 172.6 cm.; English 171.2 cm.; Welsh, 169.4 cm. —*O. A. Stevens.*

2433. Leake, H. Martin, and B. Ram Pershad. **The coloration of the testa of the poppy seed (Papaver somniferum L.)** Jour. Genetics 12: 247–249. 1922.—Three pairs of genes are stated to affect the seed color of the opium poppy. (1) *S* with *pp* causes straw color. *SS* is not markedly distinguishable from *Ss*. (2) *P* with *ss* and *bb* causes pink color, seen only in bulk. *PP* and *Pp* are indistinguishable. (3) *B* with *P* and *ss* gives blue. (4) *S* and *P* with *bb* give brown, which is with difficulty distinguished from homozygous straw; but all plants with *P* have color in the eye of the petal. (5) *SSPPBB* is deep purple, while *Ss* is gray, and the 2 intergrade. (6) Linkage is stated to occur between *S* and *B*.—*John Belling.*

2434. Mendiola, Nemesio B. **Improvement of the Lanzon (Lansium domesticum Jack).** Philippine Agric. 11: 117–123. *1 pl.* 1922.—Studies have been begun on improvement of *Lansium domesticum* by multiplication of the sweetest varieties, multiplication of varieties or bud mutations producing seedless or nearly seedless fruits, elimination of the milky juice of the rind and the bitter taste of the seed covering, elimination of the loose tissues lying at the center of the fruit between the fruit segments, and production of better-yielding strains. Six distinct types of trees are described; these differ in period required for flowering and fruiting, and in sweetness, form and size, flavor, quality, and seedlessness of fruit. Though commonly grown from seed, the tree may be propagated by marcottage, air layering, and graftage, and it is hoped that desirable forms may be preserved by these methods. Correlation between seedlessness and symmetry of fruit was determined for 478 fruits, and was found to be + 0.741 ± 0.014. It was found that 208 non-symmetrical fruits contained seed, 102 non-symmetrical fruits were seedless, 39 symmetrical fruits contained seed, and 129 symmetrical fruits were seedless.—*Sam F. Trelease.*

2435. Morgan, Thomas H. **Some possible bearings of genetics on pathology. (Middleton Goldsmith lecture, 1922.)** *33 p., 14 fig.* New Era Printing Company: Lancaster, Pennsylvania, 1922.—Genetic interpretation of pathological characters, its accuracy, and possible effects are discussed. Inheritance of shortened 1st digits is cited as an illustration of dominance and of a lethal when homozygous. Hemophilia and color-blindness are cases of sex-linked inheritance. Inheritance of so-called blood groups on Mendelian assumption of 2 pairs of factors is demonstrated. Individuals belonging to same group do not agglutinate each other's blood, but corpuscles of *AA* or *Aa* individuals are agglutinated by *aa* and *BB* or *Bb* individuals by *bb*. Height or stature is probably an hereditary trait, with glandular and probably also quantitative chemical background. The author suggests caution in interpretation of feeblemindedness as due to simple Mendelian difference. Immunity and disease are discussed with special reference to the cancer problem. Cases in higher mammals in which an induced variation is said to be inherited are of great interest to pathology. Application of genetics to pathology is pioneer work. The danger in drawing premature conclusions from insufficient evidence is pointed out.—*E. E. Jones.*

2436. Nikolaewa, A. [German rev. of: Nikolaewa, A. **Zur Cytologie der Triticumarten. (On the cytology of Triticum-species.)** Verhandl. Kongr. Pflanzenzücht.: Saratow, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 208–209. 1922.—Chromosome counts of wheat species were made from vegetative cells. *Triticum monococcum* has 14 chromosomes; *T. durum, T. polonicum, T. turgidum*, and *T. dicoccum*, 28; *T. vulgare*, 42–44; *T. spelta*, 44; and in 1 case 50 chromosomes were counted in *T. compactum*. The cytological grouping is in accord with Tschermak's genetic classification, with Zade's serological classification, and with Vavilov's classification in respect to disease resistance.—*Karl Sax.*

2437. Nikolaewa, A. [German rev. of: Nikolaewa, A. **Zur Kenntnis der Chromosomenzahl in der Gattung Avena. (Chromosome number in the genus Avena.)** Verhandl. Kongr. Pflanzenzücht.: Saratow, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 209–210. 1922.—*Avena brevis, A. strigosa*, and *A. nuda biaristata* have 14–16 chromosomes; *A. sterilis, A. Ludowiciana, A. byzantina*, 44; *A. fatua, A. sativa, A. nuda inermis*, 48; and *A. barbata*, 32. Preparations were made from root tips.—*Karl Sax.*

2438. Pater, B. **Eine neuere Abnormität an Digitalis purpurea L.** [A new abnormality in Digitalis purpurea L.] Zeitschr. Pflanzenkrankh. 32: 97–102. *Fig. 1-3.* 1922.—Cases of pelorism and color variation in blossoms have occurred for several years in the author's experiment plots of *Digitalis purpurea.* In 1921 an abnormal plant was found, characterized by frequent branching and erect flowers like those of *Pentstemon,* some green in color, others dark brownish red. In some blossoms the crown was split into 2 parts; others remained entire, a long green, branched shoot bearing small leaves and rudimentary blossoms developing from the center. Many cases of pelorism were also observed, all of them occurring in a plot into which plants had been transplanted, none being found in plots where plants had grown from seed. The author's observations agree with those of Peyritsch that pelorism occurs most frequently among plants subjected to a change in living conditions.—*Edith K. Cash.*

2439. Peacock, A. D. **Pairing and parthenogenesis in saw-flies.** Nature 110: 215. 1922 —Females of *Athalia liniolata* Lep. are much more abundant than males. Males of *Pristophora pallipes* Lep. are extremely rare. No males of *Allantus pallipes* Spin. have been taken or bred. When bred parthenogenetically, about 30 species produce males only; about 13, females only; about 6, both sexes. Many species are facultatively parthenogenetic. Certain species refuse to mate in captivity. *Athalia liniolata* mated and was probably polyandrous. Females of *Platycampus lucidiventris* Fall. ignore males and lay eggs parthenogenetically. Virgin females of *Phymatocera aterrima* Kl. and *Nematinus luteus* Panz. laid eggs which produced larvae and then paired with males. Varied conditions are regarded as of value in regulating sex ratio.—*P. W. Whiting.*

2440. Punnett, R. C. **On a case of patching in the flower colour of the sweet pea (Lathyrus odoratus).** Jour. Genetics 12: 255-281. *1 pl., 3 fig.* 1922.—The author gives the genetical behavior of patching in the flower color of the sweet pea. Plants or shoots, bearing these patched or mosaic flowers, are affected in habit of growth, being less luxuriant than normals. All tested plants, showing mosaic flowers, were found to be heterozygous, producing normal, patched, and red flowers in varying proportions. Since expected Mendelian ratios did not occur, the inheritance of patching in the sweet pea was thought to be possibly analogous to reported cases of flaking in *Mirabilis* and *Primula,* variegation in maize, and striping in *Antirrhinum.* Hypothetical explanations are given as to why irregular segregations occurred.—*Richard Wellington.*

2441. Ris, Victor. **Some notes on rubber estates of the future.** Malayan Agric. Jour. 10: 112-117. 1922.—A paper in the Archief voor de Rubbercultuur is reprinted indicating the great importance of selection work in the present competition for existence between rubber plantations.—*I. H. Burkill.*

2442. Roberts, H. F. **A new method of corn improvement by selection.** Sci. Agric. 3: 37-50. 1922.—Following an extensive review of the literature on the subject of selection in maize the author proposes 3 methods of breeding corn: 1 adapted for experiment stations, 1 for commercial breeders, and the 3rd for the farmer. These systems all involve various modifications of the ear-to-row method. The effect of selection of various plant and ear characters on yield of grain is summarized and a comprehensive bibliography is appended.—*J. H. Kempton.*

2443. Salaman, Redcliffe N. **The inheritance of fur types and hair characters in rabbits.** Jour. Genetics 12: 179–207. *24 fig.* 1922.—Following on research of inheritance of human hair shape, the author investigated a series of rabbit skins lent him by C. C. Hurst, upon which the latter founded his research on the heredity of coat characters [Hurst, C. C. **Experimental studies in heredity in rabbits.** Jour. Linn. Soc. Zool. 29: 233. 1905]. There are 2 distinct types of fur in the rabbit, designated in this paper as "A" and "B" types. "A" is common to the wild and all short-coated rabbits, and in addition it is found in some Angoras. There is no correlation between either of the 2 types and coat color or other distinctive patterns

recognized by the fancier or with sex. "B" is a type exclusively found in some long-coated rabbits. There are 3 shapes common to the transverse sections of the Small-hair at the skin level, square, round, and oval. The square type is recessive and can occur pure, the round type is dominant to the square and was found pure only in relation to "B" type pelts; the oval is the form most in evidence in the wild rabbit, and is the normal dominant form in short-coats. In certain rabbits exhibiting the Dutch marking, transverse sections of the Small-hairs in the white areas are found to be of a square shape, and those in the dark of a round or oval shape. This condition is to be found on both short- and long-coated Dutch marked animals. In 1 instance where the Dutch pattern was developed in an animal, heterozygous for square and round hair section, as well as "A"- and "B"- pelt types, a differentiation took place so that the white area presented entirely different hair characters from that existing in the dark portion. The differentiating factor, whether heterozygous or otherwise, is able to influence the hair shapes much more completely in an animal which is pure for the Dutch pattern factor than in one which is heterozygous and which exhibits the presence of the factor only by the "marking" on the shoulder. The suggestion is made that the extreme looseness and elasticity of the ordinary rabbit pelt in life is associated with the physiological requirements of the hair follicles, which at certain recurrent phases of the coat's growth, must accomodate hairs the transverse area of which is as much as tenfold that of the same when fully grown.—*Redcliffe N. Salaman.*

2444. Sando, C. E., and H. H. Bartlett. **Pigments of the Mendelian color types in maize: isoquercitrin from brown-husked maize.** Jour. Biol. Chem. **54**: 629–645. 1922.—The chemical nature of plant colors is discussed and the desirability of correlating chemical compounds with genetic factors is pointed out. For this purpose color types of maize have been chosen and a brief description of the interaction of 3 plant color factors, *A*, *B*, and *Pl*, proposed by Emerson, is given. A flavonal glucoside known as isoquercitrin has been isolated from the husks of Emerson's brown type of maize having the factorial composition *aa*, *BB*, *Pl Pl*. This glucoside is identical with that originally found by Perkins in cotton flowers and probably also with a similar substance derived by Heyl from the pollen of ragweed. The relatively large yield of this glucoside from maize has made it possible to add to the characterization of isoquercitrin by Perkins and the methods by which it was extracted and identified are given in detail.—*J. H. Kempton.*

2445. Schegalow, S. [German rev. of: Schegalow, S. **Das Erscheinen des Gigantismus beim Hafer. (The appearance of gigantism in oats.)** Verhandl. Kongr. Pflanzenzücht.: Saratow, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. **29**: 207–208. 1922.—Gigas types of individuals were found in a selection of *Avena orientalis*. They constituted about 25 per cent of the progeny of 1 selection and bred true in later generations. The gigas type was relatively sterile and under usual conditions matured very late. The chromosome number was found to be the same as for the normal form.—*Karl Sax.*

2446. Schmidt, Johs. **Diallel crossings with the domestic fowl.** Jour. Genetics **12**: 241–245. 1922.—Two cocks, X and Y, of mixed breeding were each mated with the same 5 hens, a, b, d, e, and f, and 5 progeny from each mating—making a total of 50 chickens—were studied. The number of vertebrae in each individual was counted. The average number of vertebrae in the 25 daughters of each cock is called his "generative value" and the actual number of vertebrae in his body, his "personal value." The same application is made to the hens.—*F. A. Hays.*

2447. Shull, G. H. **Über die Heterozygotie mit Rücksicht auf den praktischen Züchtungserfolg. [On heterozygosis with emphasis on the practical breeding results.]** Beitr. Pflanzenzucht **5**: 134–152. *9 fig.* 1922.—Self-fertilized strains of maize when crossed gave increases in yield of grain of 380 per cent above the inbred parents in the 1st generation, 41 per cent in the 2nd, and 27.4 per cent in the 3rd. The best F_1 crosses exceeded the original cross-pollinated variety by 20 per cent. The coefficient of variability of the inbred strains

was 9.08 per cent, for F_1, 9.06 per cent, and for F_2, 12.63 per cent. The increase in size and vigor resulting from crossing is called heterosis and is interpreted as due to a stimulation accompanying heterozygosis. While selection of the best individuals for breeding purposes in self-fertilized, homozygous plants is justified, on account of heterosis the best individuals in cross-fertilized plants and in animals are not the ones which always give the best results. [A discussion follows on pages 152–158.]—*D. F. Jones.*

2448. Smith, Loren B. **Breeding mosaic resistant spinach and notes on malnutrition.** Virginia Truck Exp. Sta. Bull. 31/32. *138–160.* 1920.—The author discusses chiefly methods used in the development of the Virginia Savoy, a mosaic-resistant spinach. The resistance factor was obtained from a variety of spinach known as Manchuria obtained by the late Frank M. Meyer, near Liaoyang, Manchuria. The latter variety furnished the female and the varieties Round Thick-leaf Winter, Bloomsdale Savoy, Long Standing, and Viroflay the male parentage of the best strains of the Virginia Savoy. "The hybrids after several years of field selection and roguing, gradually developed a fairly uniform type and a high degree of mosaic resistance." In selecting desirable strains the characters taken into consideration were (1) resistance to mosaic, (2) size of plant, (3) savoying, (4) color, (5) thickness of leaves, (6) closeness, (7) shape of leaves, (8) long standing qualities, (9) type of growth, (10) number of shoots at crown, and (11) color of petioles. Besides being resistant to mosaic, the Virginia Savoy is less attractive to aphids than other commercial varieties. In Feb. 1918, field counts showed 3.2 per cent of commercial Savoy plants uninfested while 69.1 per cent of the Virginia Savoy plants were uninfested. This was found to hold true repeatedly under greenhouse, field cage, and field conditions. The author states, however, that "during the periods favorable for the development of aphids the Virginia Savoy stocks may become as heavily infested as other varieties." By rigid selection of stocks the mosaic was decreased from 6.14 per cent in the F_2 Manchuria-Savoy hybrid generation to 0.64 per cent in the F_5 generation. "The Virginia Savoy variety compares favorably with the commercial strains in the production of marketable spinach. In 1918 the former yielded 146 barrels and the latter 135 barrels per acre."—*H. A. Jones.*

2449. Sprague, T. A. **Meristic variation in Papaver dubium.** Jour. Bot. 60: 299–300. 1922.—Variation is noted in the number of stigma-rays. Poorly nourished plants have fewer and well nourished more rays than the average. A positive correlation was observed between number of flowers per plant and number of stigma-rays per flower.—*J. L. Collins.*

2450. Stout, A. B. **Preliminary report of investigations with species of Lilium.** Jour. New York Bot. Gard. 23: 155–158. 1922.—Over 30 species of lilies have been studied. Lack or irregularity of seed production in these Liliums was shown to be due mainly to self or cross incompatibility. Varieties from China are being crossed with cultivated strains of the same species to test for cross compatibility. Several species of *Lilium* native to the U. S. A. have been successfully crossed. The chief aims of the work are to determine cultural requirements; and to study self and cross compatibility, the limits of hybridization, and the natural relationships of the varieties and species.—*John Belling.*

2451. Süffert, F. [German rev. of: Knoll, Fritz. **Insekten und Blumen. Experimentelle Arbeiten zur Vertiefung unserer Kenntnisse über die Wechselbeziehungen zwischen Pflanzen und Tieren. (Insects and flowers. Experimental work to enlarge our knowledge of the mutual relations between plants and animals.)** Abhandl. Zool.-Bot. Ges. Wien 12: *119 p.* 1921.] Zeitschr. Indukt. Abstamm. -u. Vererb. 29: 202–207. 1922.—As the elements in flower biology K. Chr. Sprengel has listed the sexual apparatus, nectar, corolla color, and fragrance; of these Knoll investigated place of corolla color and fragrance in insect attraction. He used *Bombylius fuliginosus* (bee-fly) and *Muscari racemosum* (grape hyacinth), the latter having a spike of sterile, closed, and odorless flowers at top and fertile, fragrant flowers with nectar below. Evidence from work on distribution of odor, separation of odor from color stimuli, neutralization of color, blue and gray papers indicate reaction of insect to hue and

not to brightness value or odor, at a distance. After insect has approached blossom, odor is responsible for attachment to it. Further work indicates positive reaction of *Bombylius fuliginosus* to blue and disregard of yellow flowers even though they contain nectar, except after the *Muscari racemosum* season is over. *Bombylius medius*, which uses pollen as well as nectar, reacts positively to yellow flowers. *B. fulvescens*, which like *B. fuliginosus* uses only nectar, reacts only to blue flowers. Where *B. fuliginosus* occurs all flowers offering nothing to it are yellow and this may account for connection with non-yellow flowers.—Süffert suggests possibility of inherited reaction here, though acquirement of relationship between insect and flower is not excluded. He considers the importance of researches of this kind to consist in the analysis of specific cases of adaptation, and commends the author's efforts to set forth purely objectively what has hitherto been under the cloud of teleological and "purposeful" speculations.—*Helen D. Hill.*

2452. Sumner, Francis B., Mary E. McDaniel, and Ralph R. Huestis. **A study of influences which may affect the sex-ratio of the deermouse** (Peromyscus). Biol. Bull. 43: 123–165. *7 fig.* 1922.—Data are based on over 4,600 deer mice of known sex, born and raised in captivity, under temperature conditions approximating those existing in nature. Litter size 1 to 9, mean of 1,567 litters, is 3.22. Sex ratio for the whole population is 97.37 ± 1.93. When only litters in which no deaths are known to have occurred are included, the sex ratio becomes 98.01 ± 2.07. Litters known to have been incomplete give a ratio of 93.08 ± 5.25. To eliminate the effect of seasonal differences, the mean of the monthly means was computed and found to be 95.65. The authors state that none of these figures differs significantly. Probable errors in this paper were based on a formula giving about twice as great errors as that employed by previous writers, and the probabilities claimed by the authors are correspondingly lower. A definite seasonal cycle seems to exist in the proportion of males to females born. Two annual maxima occur, in Mar.–Apr. and Aug.–Oct.; the lowest ratio is 78.79 ± 6.93 in Nov., the highest 113.04 ± 8.04 in Apr. This difference is 3¼ times the probable error and would ordinarily be considered significant. But when the material is subdivided differently the results are in some cases contradictory and the authors do not regard the existence of seasonal cycle in sex ratio to be proved conclusively by their data. "Subspecific" hybrids (1,722) give mean ratio of 104.76 ± 3.41. Mice of "pure" race (2,930) give mean ratio of 93.27 ± 2.32. Positive correlation exists in this material between size of litter and sex ratio. Litters of 1–3 give mean ratio of 94.85 ± 2.94, those of 4–9 give mean ratio of 102.42 ± 3.01. Size of probable errors raises question as to significance of this correlation, however. No preponderant tendency toward production of homosexual litters was found, thus no likelihood that polyembryony is at all common. Sex ratio is lower for earlier litters (91.7) than for later ones from the same mother (103.3); numbers are small, however, inbreeding and outbreeding seem to have had no effect. Negative results were obtained from comparison of offspring of meat-fed individuals with offspring of individuals with strictly vegetarian diet; numbers here were also small. The most significant result, statistically speaking, is the fact that sex ratios for the 7 different years included in the records show wide variation, ranging from 125.36 ± 7.82 in 1916 to 70.56 ± 4.70 in 1917. This difference is not due to seasonal distribution of births, nor to preponderance of hybrid births, nor to operation of any other recognized factors.—*E. E. Jones.*

2453. Tschermak, E. [Rev. of: (1) Baur, E. **Die wissenschaftlichen Grundlagen der Pflanzenzüchtung. Ein Lehrbuch für Landwirte, Gärtner und Forstleute. (The principles of plant breeding. A textbook for agriculturists, gardners and foresters.)** *v + 120 p., 6 pl., 11 fig.* Gebruder Borntraeger: Berlin, 1921 (see Bot. Absts. 12, Entry 1034). (2) Fruwirth, C., und Th. Roemer. **Einführung in die landwirtschaftliche Pflanzenzüchtung. (Introduction to agricultural plant breeding.)** *150 p., 4 pl., 27 fig.* Paul Parey: Berlin, 1921.] Wiener Landw. Zeitg. 72: 1922.—The first book is to be recommended for the progressive farmer or gardner who wishes to know the essentials of the theory and practice of plant breeding; the 2nd serves a very useful purpose in providing instructors of plant breeding with an inexpensive text which is more suitable for general students than Fruwirth's Handbook of Agricultural Plant Breeding. [See also Bot. Absts. 11, Entry 2472; 12, Entry 1784.]—*F. Weiss.*

2454. Tornau. **Die Züchtung des Göttinger Roggens.** [The breeding of Göttinger rye.] Jour. Landw. 70: 171–190. 1922.—Selections of 3 lines of Göttinger rye grown for 10 years and 1 pure line grown for 6 years show no decreased yield due to inbreeding. It is shown by statistical methods that inbreeding did not change the relation of various morphological characters.—*Karl Sax.*

2455. Uphof, J. C. Th. **Eine polymorphe F_1-Generation aus der Kreuzung von Phaseolus vulgaris und Phaseolus multiflorus.** [A polymorphous F_1 generation from crossing P. vulgaris and P. multiflorus.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 186–192. 1922.—In crosses of varieties of *Phaseolus vulgaris* × *P. multiflorus* F_1 plants were obtained which differed greatly in size, leaf shape, and size of seed. The F_1 flower color and seed color was like that of the male parent.—*Karl Sax.*

2456. Warren, Ernest. **A preliminary account of an interspecific hybrid and backcrosses of Digitalis.** South African Jour. Sci. 18: 359–373. *Pl. 4–5.* 1922.—Results are recorded of hybrids between *D. gloxiniaeflora* and *D. lutea* and also of backcrosses of the hybrid with the parent species. Crossing the 2 species was found to be more difficult when *D. lutea* was used as the seed plant instead of *D. gloxiniaeflora.* The hybrids resembled *D. gloxiniaeflora* more closely than *D. lutea* in general appearance, in relative width of leaf, length and breadth of flowers, and ratio of these dimensions.—The data obtained from backcrosses of the hybrids with both parents is tabulated. In the characters measured, the factors appear to blend on crossing rather than to remain unchanged. "In all the measurable characters examined there was no clear reappearance in the backcrosses of the grandparental characters in an uncontaminated condition. The view that these results are due in every case to the existence of multiple, independent, unchangeable factors would be only justified if the backcross offspring exhibited exceptional variability, but such is not the case. Thus the results obtained with interspecific hybrids resemble those found with intervarietal hybrids." [See also following entry.]—*Edith K. Cash.*

2457. Warren, Ernest. **Inheritance in the foxglove, and the result of selective breeding.** Biometrika 14: 103–126. *Pl. 1.* 1922.—Additional data on crossing *Digitalis gloxiniaeflora* are recorded in continuation of experiments previously reported [see preceding entry]. The author concludes that "the mode of inheritance is Mendelian with reference to the qualities peloric and non-peloric, purple and white corolla, purple spots and brown spots. If, however, there are any marked differences in the intensities of these qualities, the mode of inheritance of the intensity of the quality was found to be of the blended type. The other characters examined were quantitative in nature, such as degree of the development of purple spots and the ratio of breadth to length of corolla, and these characters blended completely. The evidence of the present investigation is therefore definitely against any general application of the theory of pure-lines and of genotypes of any appreciable magnitude, and further it indicates that selective breeding within self-fertilised generations of a homogeneous race is capable of modifying that race to a marked degree."—*Edith K. Cash.*

2458. Winge, Ø. **One-sided masculine and sex-linked inheritance in Lebister reticulatus.** Jour. Genetics 12: 145–162. *2 pl.* 1922.—The secondary sex-characters in *Lebistes* are inherited as either one-sided masculine with the X-chromosomes empty, or as a one-sided masculine and sex-linked combination with the X-chromosome containing factors for color. "The whole mode of inheritance is sex-limited to the male individuals, as the factors are found cryptomerically in the females." The condition is the opposite of that in *Drosophila* as the Y-chromosome carries color factors in all the races examined. The principle difference between the X- and Y-chromosomes is that the male sex is represented by a dominant factor in the latter and the female sex by the allelomorphic factor in the former. Crossing over appears to occur rarely between the X- and Y-chromosomes. The females have 44 + X + X chromosomes and the males 44 + X + Y. The genotype of each male may be determined by observation of the color effects. The females all present the same appearance.—*Robert K. Nabours.*

2459. Woodworth, C. M. **The extent of natural cross-pollination in soybeans.** Jour. Amer. Soc. Agron. 14: 278–283. 1922.—Natural hybrids are shown to occur in the soybean. In a total of 205 seed from recessive white-flowered plants, none proved to be hybrid. When cotyledon color was used as an index of hybridity, only 3 pods in a total of 7,480 contained hybrid seed. If all of the ways in which crossing may occur are taken into account the proportion would be 1 hybrid pod in 625, or 0.16 per cent. The variety, locality, and season will cause the percentage of cross pollination to vary. Hybrids may also arise by mutation.—*F. M. Schertz.*

HORTICULTURE

J. H. Gourley, *Editor*

(See also in this issues Entries 2229, 2269, 2284, 2294, 2327, 2343, 2390, 2400, 2401, 2405, 2406, 2428, 2429, 2430, 2434, 2441, 2448, 2510, 2673, 2696, 2698, 2785, 2792, 2795, 2811, 2812, 2891)

FRUITS AND GENERAL HORTICULTURE

2460. Anonymous. **Fruit-growing and research.** Nature 110: 497. 1922.

2461. Anonymous. **The 1922 fruit crop.** Jour. Dept. Agric. Ireland 22: 285–286. 1922.—The general effects of weather, insects, and diseases on apples, pears, and other fruits are noted.—*Donald Folsom.*

2462. Andrews, J. W. **Refrigeration and pre-cooling of citrus fruit.** Proc. Florida State Hort. Soc. 35: 59–62. 1922.—This is a report on experiments in pre-cooling oranges in Florida. Under the most favorable conditions it requires 6 hours to cool the fruits in a single box from 85 to 40°F., and to this 1 hour must be added if the "wad pack" is used. If a large number of boxes are stacked in a typical pre-cooling room it requires 3-4 times as long. A study of individual car records indicate that under ordinary conditions icing in transit is not necessary.—*J. C. Th. Uphof.*

2463. Bartlett, R. G. **The cultivation of ginger.** Agric. Gaz. New South Wales 33: 818. 1922.—Two-eyed sets are planted in 2-foot drills 9 inches apart to a depth of 3 inches in manured soil. The crop is harvested in the flowering stage and yields 2-4 tons per acre.—*L. R. Waldron.*

2464. Bartlett, R. G. **The manuring of bananas.** Agric. Gaz. New South Wales 33: 830-832. 1922.—The importance of humus and the value and kinds of cover crops are discussed. Two fertilizers rich in potash are suggested.—*L. R. Waldron.*

2465. Beckwith, Charles S. **August flooding for cranberry girdler.** Proc. Amer. Cranberry Growers' Assoc. Proc. Ann. Conv. 53: [Pages unnumbered.] 1922.—Damage in New Jersey by cranberry girdlers was increasingly severe in 1921-1922. Flooding the bogs for 24 hours in early August causes the girdlers to float ashore where they are destroyed by predaceous insects. (Girdlers submerged in cheese cloth bags were killed in 24 hours.) This resulted in lessened infestation the succeeding year. Flooding in August is dangerous and should be used only as a last resort in serious infestations.—*J. K. Shaw.*

2466. Bioletti, Frederic T. **Pruning young olive trees.** California Agric. Exp. Sta. Bull. 348. *87–110.* 1922.—Pruning retards the growth of olive trees, especially when young. The excessive pruning often practiced on young trees may retard development 90 per cent. Mission olives which receive no pruning during the first 4–5 years develop a more perfect form than pruned trees. The method of handling young Mission olives recommended on the basis of 5 years' experiments hastens development, improves form, promotes early bearing, and saves the whole expense of pruning for 4–5 years. The method is probably applicable to any

varieties of naturally upright habit. The use of stakes and tying may be required during the first 2-3 years with varieties of spreading habit like the Manzanillo and Ascolano. This expense would be offset by the saving in pruning and the improved form of the tree; and the more rapid development would be a net gain.—*A. R. C. Haas.*

2467. Bioletti, Frederic T. **Supports for vines.** California Agric. Exp. Sta. Circ. 252. *19 p.* 1922.—The methods described in this circular are suited to nearly all the varieties and conditions of the grape-growing districts in California. In the 1st method the head-pruned vines require only temporary supports; under most favorable conditions the stake may be removed in 2–4 years. The stakes are joined by fencing wire. The 2nd method is used when weeds make cross-cultivation necessary; here the wire is omitted. The 3rd method is for cane-pruned vines which require permanent supports for the annually renewed fruit canes, and consists of a trellis made of pickets and 2 wires. The 4th method is a modification of the 3rd. Directions are given in regard to the heights of stakes and wires, the number of wires, the time of placing supports, support allignment, and the length of trellises, together with kinds and cost of materials and the labor costs.—*A. R. C. Haas.*

2468. Bioletti, Frederic T. **Vineyard plans.** California Agric. Exp. Sta. Circ. 253. *12 p.* 1922.—Directions are given covering the planting and irrigation of vineyards.—*A. R. C. Haas.*

2469. Darnell-Smith, G. P. **The effect of blood manures on citrus.** Agric. Gaz. New South Wales **33:** 823. 1922.—It is not evident from experiments that injurious results follow application of blood manures to citrus fruits other than are brought about purely by the excessive application of nitrogen contained in the fertilizer. Blood manures did not increase die-back.—*L. R. Waldron.*

2470. Dearing, Chas. **Grape growing in Florida.** Proc. Florida State Hort. Soc. **35:** 121–126. 1922.—The European grape (*Vitis vinifera*) is of little importance in Florida and commercial plantings are not recommended. In northern Florida the Muscadine grape is promising as a commercial venture.—*J. C. Th. Uphof.*

2471. Koch, Richard. **Die Einführung der helländischen versteigerung in Straelen, Crefeld, Schierstein, Ocholt usw. [The introduction of Dutch auctioning in Straelen, Crefeld Schierstein, Ocholt, etc.]** Gartenwelt **26:** 509–511. *1 fig.* 1922.—It is emphasized that Dutch auctioning of fruits and vegetables should be introduced into Germany. The electric selling apparatus as generally used in Holland and in a few places in Germany is described and its good points discussed.—*J. C. Th. Uphof.*

2472. Kurt, Meymund. **Unsere Baumschulen, ihr rascher Aufstieg und ihr heutige Bedeutung. [Our nurseries, their rapid development and present significance.]** Gartenwelt **26:** 457–459. 1922.—A general description is given of the development and importance of German nurseries where trees and shrubs are grown. In 1870–71 the only firms of importance were those in France, Belgium, and Holland. German nurserymen who had worked abroad adapted the foreign methods to their conditions and at present there are 1,600-1,800 such nurseries in Germany with about 15,000 persons employed.—*J. C. Th. Uphof.*

2473. Leonard, George V. **Grove factors influencing citrus fruit quality.** Proc. Florida State Hort. Soc. **35:** 21–24. 1922.—Oranges are grown in all sections of Florida but the rather heavy, stony soils give the best quality of fruit. The sour orange [*Citrus aurantium*] is preferred as a root stock for most conditions, but on the ridge land of the lower East Coast in Polk County, the Rough lemon stock gave good results. There was an indication that the fruit dried out at the stem end when Valencias were budded on lemon stock. Varieties, tillage, fertilizers, spraying, and pruning are also discussed.—*J. C. Th. Uphof.*

2474. Liems, J. A. **De Sinaasappelcultuur.** [Orange growing.] West-Indië 7: 3–11. 1922.—In Surinam, of all tropical fruits, the orange is best suited for export. It ripens July-Oct. when no other oranges are on the European markets. Sand is better than clay for its culture. Lime [*Citrus aurantifolia*] and lemon seedlings are recommended for stocks. The following varieties are recommended: Groningen, a native variety, Washington Naval, and Lambs Summer. Some good native sorts are also worthy of further observation.—*J. C. Th. Uphof.*

2475. Liems, J. A. **Proefneming met sinaasappel op lemmetje onderstam.** [Experiments of oranges on lime stock.] West Indië 7: 12–14. 1922.—On account of the warm, moist climate the humus supply soon disappears from the highland soils after timber is removed. On such soils the lime [*Citrus aurantifolia*] has proved a better stock for orange than orange seedlings.—*J. C. Th. Uphof.*

2476. Milsum, J. N. **The Brazil-nut in Malaya.** Malayan Agric. Jour. 10: 87–88. 1922. —At Kuala Lumpur the Brazil-nut (*Bertholletia*) has set fruit when 9 years old. Propagation by cuttings and layers has not been found possible.—*I. H. Burkill.*

2477. Morley, John. **Avocados on high pine land.** Proc. Florida State Hort. Soc. 35: 42–45. 1922.—It was observed that on high pine land the avocado trees developed more short fruiting branches than those grown on muck soils. Planting and fertilizing are discussed. Careful shading was adopted and frequent watering of the grove practiced. Mulching was followed at first but later abandoned for cultivation. The varieties grown are Trapp and Pollock.—*J. C. Th. Uphof.*

2478. Popenoe, Wilson. **Avocado explorations in tropical America.** Proc. Florida State Hort. Soc. 34: 31–36. 1922.—This article describes the 3rd avocado expedition to South and Central America. A wild form was discovered on the slopes of the Irazu volcano in Costa Rica which may be the prototype of the cultivated varieties of West India and Guatemala. It may prove to be of value as a stock on which to work some of the more delicate varieties and for use in breeding. The wild avocado (*aguacate de anis*) grows in small ravines and on moist slopes at an elevation of 400-600 feet. The wild avocados of Santa Marta, Columbia, are of the West India race and have escaped from cultivation. Some valuable cultivated varieties of the Mexican race were found in Ibarra, northern Ecuador. They are larger than any variety in Mexico or California and came from the valley of the Rio Chora where several thousand avocado trees are grown. The most promising variety introduced into the U. S. A. weighs 18 ounces, has small seeds, and flesh free from fiber. It was named for an Ecuadoran Tamayo. [See also Bot. Absts. 11, Entry 4026.]—*J. C. Th. Uphof.*

2479. Sands, W. N. **The cinchona (quinine) industry in Java.** Malayan Agric. Jour. 10: 65–86. 1922.—A report upon the various phases of cinchona cultivation in Java is presented.—*I. H. Burkill.*

2480. Sax, Karl, and John W. Gowen. **The relation of tree type to productivity in the apple.** Maine Agric. Exp. Sta. Bull. 305. *20 p., 4 fig.* 1922.—In 1 Ben Davis orchard of 881 trees, productiveness is associated with large size and great number of laterals while unproductiveness is associated with small size and upright spurless branches. Differences in productivity are attributed to differences in soil and root stocks rather than to scions. It is recommended that root stocks for new orchards be from rapidly growing 1-year old stock.—*Donald Folsom.*

2481. Stoddart, J. **Grading and sizing of apples.** Jour. Ministry Agric. Great Britain 29: 543–545. 1922.—An improved type of handsizer for apples is described and illustrated.—*M. B. McKay.*

2482. Tufts, Warren P., and Guy L. Philip. **Almond pollination.** California Agric. Exp. Sta. Bull. 346. *3–35.* 1922.—Almond varieties may be roughly divided into 2 classes, early bloomers and late bloomers, when the length of effective full bloom is considered. The 1st blossoms produced by most almond varieties yield a smaller amount of pollen, which is also inferior in viability to that produced by flowers on the same tree maturing several days or a week later. Pollinizing agencies, such as the honey bee, are necessary to the set of a good crop of fruit. One colony of honey bees should be provided for each acre of orchard. All almond varieties thus far tested have proved self-sterile, at least in certain years. The I. X. L. and Nonpareil varieties proved practically inter-sterile during 3 seasons' work. The Languedoc and Texas proved practically inter-sterile in 1917 and 1919. The California, disregarding its own commercial value, seems to be the best pollinizer for all varieties thus far tested which have a coincident period of bloom. Data on successful inter-varietal pollinations are given for many varieties. Care should be taken in the arrangement of varieties in the orchard to facilitate cross-pollination and convenience in harvesting.—*A. R. C. Haas.*

2483. Vaile, R. S. **Fertilizer experiments with citrus trees.** California Agric. Exp. Sta. Bull. 345. *466–512.* 1922.—There is a positive value to be derived from fertilizing citrus trees on any of the soils involved in these trials, as measured by increased crop yields. The chief response is obtained from nitrogen, none following the use of potash or phosphoric acid in any of the trails reported, either when used alone or in conjunction with nitrogen. Lime, applied as ground limestone, has not been of value in the trials reported except at Chula Vista on the Kimball sandy loam soil. Bulky organic material has been of importance in citrus fertilization. Specific fertilizing materials have given different results in different locations, so much so that findings from one set of field trials should not be too literally interpreted for any other set of conditions. Field trials and orchard surveys indicate clearly that fertilization is required for the economical production of citrus fruits under usual southern California conditions. It appears that fertilizing is often delayed too long after planting and that larger applications might be used with profit. Neglected groves may be improved by the use of nitrogenous fertilizers. Typical mottle leaf and attendant characteristics are not improved by the use of commercial fertilizers, particularly inorganic forms. Covering the ground with straw mulch, thus eliminating the necessity for tillage, improves run-down citrus groves. This method of culture is likely to be limited in effectiveness to a period of 2-3 years, following which ordinary tillage should again be resorted to. The use of green-manure crops in winter has been followed by conflicting results in the different trials.—*A. R. C. Haas.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

2484. Anonymous. **A national arboretum and garden in Washington.** Wild Flower Preservation Soc. [Washington, D. C.] Circ. 5. *4 p.* 1923.—This circular sets forth the desirability of securing a tract of 800, which in the future could be increased to 2000, acres along the Anacostia River at the northerly end of Maryland avenue, 2 miles from the Capitol. This tract of land would be used as a site for a national arboretum and the Washington Botanical Garden would be moved there from its present location.—*C. G. Vinson.*

2485. Benedict, R. C. **Ferns as house plants.** Amer. Fern Jour. **12**: 77–92. *Pl. 5–7.* 1922.—The author discusses the care of ferns in the home and the best kinds for that use. The "florist divides cultivated plants" into "four classes according to temperature requirements,"—"hardy," "semi-hardy," "greenhouse," and "stove." The semi-hardy or greenhouse types are the only ones suited for house use. Five semi-hardy and 24 sub-tropical varieties are described and most of them are illustrated by photographs.—*F. C. Anderson.*

2486. Blittera, Nikolaus. **Beiträge zum Anbau und Auslese des Mohns. [Investigations in cultivation and selection of poppies.]** Wien. Landw. Zeitg. **72**: 44–45. 1922.—Planting distance, both as between plants and rows, influences the number of capsules borne per plant, the ratio of seed weight to capsule weight, and to some extent the form of capsule. The most suitable planting distance varies among different strains. Normal capsule shape is spherical

or somewhat oblate; in cultivation pear-shaped capsules also appear. The latter show the most favorable proportion of seed weight to capsule weight and selection should seek to preserve this form. Capsules of average size rather than the largest ones show the highest seed weight in proportion to weight of capsule. Similarly capsules of light color—brown or yellowish—have a higher proportionate seed weight than the violet brown ones.—Precocious germination of seed within the capsule sometimes occurs during prolonged rainy weather. Violet-brown capsules show the most rapid water absorption and most tenacious retention, hence premature germination occurs most frequently in capsules of this color. Capsules of average size, pyriform in shape and light brown in color, should be selected.—*F. Weiss.*

2487. Clarkson, Edward H. **Experiments in naturalizing ferns.** Amer. Fern Jour. **12**: 19-22. 1922.—The article describes the transplanting of several species of ferns, giving situations where planted and results after 6 years. In most cases the ferns have done well.—*F. C. Anderson.*

2488. Lobner, M. **Pfitzers Gladiolen Neuheiten.** [Pfitzer's gladiola novelties.] Möllers Deutsch. Gärt. Zeitg. **37**: 256. 1922.—Herbstzauber flowers late and develops very large, salmon-red flowers. This variety is promising. Weisser Samling (No. 12,498), or Magnolia, has a growth similar to the former sort with pure white flowers.—*J. C. Th. Uphof.*

2489. Uphof, J. C. Th. **Das Aushöhlen der Zwiebeln bei der Vermehrung der Hyazinthen.** [Scooping of bulbs in the propagation of hyacinths.] Möller's Deutsch. Gärt. Zeitg. **37**: 277-278. *1 fig.* 1922.—This procedure is practiced in Holland, a special knife being used. Depending on the variety, the axis of the bulb is scooped out to as near the scales as possible or a cross is cut out, the bulbs being then placed upside down in boxes. The wounds are disinfected with a solution of mercuric chloride or with lime, although the latter is less effective. Later the bulbs are laid on wooden ridges in the dark at a temperature of 15-20°C. in rooms constructed for the purpose. They remain in this situation until about 2 weeks before planting, when they are slowly accustomed to daylight. They are then (Oct.–Dec.) planted upside down in the field and during the summer young bulbs develop in the old ones. The crop is harvested in July and the young bulbs replanted the following autumn, flowering in the 2nd or 3rd year.—*J. C. Th. Uphof.*

VEGETABLE CULTURE

2490. Geise, Fred W. **Storing and bedding sweet potato stock.** Virginia Truck Exp. Sta. Bull. 39/40. *223-234.* 1922.—The author discusses principles involved and methods of handling in the field and storage to obtain the highest quality sweet potato seed stock. Harvesting, selection, storage, disinfection, beds, bedding, and care of the beds are given consideration.—*H. A. Jones.*

2491. Kreuzpointer, J. **Asparagus zur Schnittgrüngewinnung.** [Asparagus for cutting bouquet-green.] Möller's Deutsch. Gart. Zeitg. **37**: 253-254. 1922.—*Asparagus retroflexus arboreus* and *A. Sieberianus* are recommended for use in bouquets. The latter can be propagated from cuttings, 30-40 per cent rooting when taken in spring or summer.—*J. C. Th. Uphof.*

2492. Magoon, C. A., and C. W. Culpepper. **A study of sweet-potato varieties, with special reference to their canning qualities.** U. S. Dept. Agric. Bull. 1041. *34 p., 3 pl.* 1922.—Forty-four varieties of sweet potatoes, here described in some detail and illustrated by color plates, were tested for canning qualities. At Arlington, Virginia, Gold Skin ranked 1st for quality of product for 2 seasons. Yellow Jersey, Early Red Carolina, and Big Stem Jersey represent the best of the dry firm types; Dooley, Porto Rico, Nancy Hall, Mullihan, and Vineless Pumpkin "yam" are good varieties of the deep colored group; and the Belmont, Miles, and Yellow Strasburg are good varieties of the lighter fleshed medium-moist type. Qualities to be considered in canning are discussed for the various varieties, also the changes after digging and the chemical changes of the product. Effect of oxygen on product, temperatures

for canning, time required, etc., are given. Potatoes which are firm after cooking contain high percentage of starch, while those which become soft have a high percentage of dextrin and low percentage of starch. Changes in plasticity are due to transformations affecting ratio of starch to moisture.—*J. T. Buchholz.*

2493. Nicolaisen, N. **Unsere Gemüsebauversuchsfelder. [Experimental fields for vegetables.]** Gartenwelt **26**: 520–521. *3 fig.* 1922.—This article outlines experimental work with vegetable crops. The types of investigations and functions stressed are: (1) adaptation of vegetables for certain uses; (2) distance for planting and best kinds of culture, proper amount of seed per unit of area, secondary crops, comparative use of machinery and hand labor; (3) fertilizer experiments; (4) studies of fungicides and insecticides; (5) testing of novelties; (6) encouragement of vegetable forcing; (7) stimulation of the use of vegetables by conducting courses in cooking; (8) acquaintance with the needs of the trade; (9) dissemination of information.—*J. C. Th. Uphof.*

2494. Smith, Loren B., and H. H. Zimmerley. **Booms for spraying truck crops.** Virginia Truck Exp. Sta. Bull. 28. *83–98.* 1919.—A description is given of booms best adapted to the spraying of potatoes, tomatoes, spinach, and kale. Lists of materials used in the construction of the various booms are included.—*H. A. Jones.*

2495. Zimmerley, H. H., and Loren B. Smith. **A study of the cost of spraying kale.** Virginia Truck Exp. Sta. Bull. 30. *121–134.* 1920.—The yearly production of kale in Eastern Virginia is 368,460 barrels For the control of cabbage worms and cabbage loopers attacking this crop, the authors recommend the use of powdered lead arsenate at the rate of 1½ pounds to 50 gallons of water. For the control of aphids, 8¾ ounces nicotine sulphate plus 5 pounds fish-oil soap to 50 gallons of water is recommended. The total cost of spraying with the lead arsenate solution when spray machine moved at the rate of 3½ miles per hour with rows 20, 24, 30, and 36 inches apart was $1.77, $1.47, $1.18, and $1.14 per acre respectively. The total cost of spraying for aphids with the nicotine sulphate and fish-oil soap solution, spray machine moving at 3½ miles an hour and the rows 20, 24, 30, and 36 inches apart, was $3.46, $2.89, $2.31, and $2.04 per acre respectively. A 2-wheel sprayer, equipped with triplex pump and gasoline engine was used. Booms, etc., used are described in bulletin 28 [see preceding entry].—*H. A. Jones.*

2496. Zimmerley H. H., Fred W. Geise, and C. R. Willey. **Dusting vegetable crops.** Virginia Truck Exp. Sta. Bull. 35/36. *193–208.* 1921.—This is a discussion of results obtained during 1921 at the Virginia Truck Experiment Station on dusting for insect and disease control. "In the laboratory the 3 per cent nicotine dust proved the most effective in the control of 4 species of aphids. Based on an average of the 4 species the 1, 2, and 3 per cent nicotine-impregnated dusts killed 72.2, 82.1, and 89.3 per cent, respectively. For the control of aphids (*Myzus persicae* and *Macrosiphum solanifolii*) on spinach, a hydrated lime carrier with 2 per cent nicotine-impregnated dust proved the most economical. The quantity necessary varied from 20 to 40 pounds per acre. For the control of the Colorado potato beetle (*Leptinotarsa decemlineata* Say) a dust mixture containing at least 20 per cent calcium arsenate is recommended. In the control of the cabbage looper (*Autographa brassicae* Riley) and the imported cabbage worm (*Pontia rapae* Seh) on kale and Brussels Sprouts, both Noburn and a 50 per cent calcium arsenate dust gave equally good control. The action of the Noburn was more rapid than that of the calcium arsenate."—*H. A. Jones.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

(See also in this issue Entries 2247, 2338, 2374, 2438, 2486, 2489, 2558, 2586, 2628, 2642, 2746, 2769, 2801, 2803, 2848, 2865, 2873, 2883)

2497. Browne, Isabel M. P. **Anatomy of Equisetum giganteum.** Bot. Gaz. 73: 447–468. *Fig. 1–7.* 1922.—The node of the young main stem, nodes of smaller fertile branches, branches initiated on the main stem, and young internodes of main stem were studied. The direction of differentiation of the metaxylem in the internode is mainly centripetal. The outer elements are the smallest, and become wider in passing inward. These lateral, internodal strands of xylem join on to the nodal wood, at which level they lose their identity. There is no indication of their persisting as strands external to the nodal wood. The protoxylem is continuous through the node. By the departure of the medianly situated tracheids to the trace the protoxylem is divided into 2 small groups which diverge and enter neighboring but separate bundles of the internode above. Each of these small strands fuses with an equivalent strand of protoxylem derived from the adjacent bundle of the internode below. The fusion is effected partly by a sudden increase in number of the protoxylem elements. The nodal wood attains a considerable height and radial depth. Wide reticulate, typically nodal tracheids appear below and persist for some distance above the departure of the traces. The protoxylem elements are situated at the interior of the xylem, and pass through the inner part of the metaxylem of the bundle in a kind of parenchymatous sheath, 2 or 4 cells in thickness. The continuity of the protoxylem of the internodes through the nodes, which, although not characteristic of all species, is not confined to *E. giganteum*, is a primitive character within the genus. The question as to whether the lateral metaxylem of the genus was primitively centripetal, as in *E. giganteum*, or primitively centrifugal, as in the other species the detailed anatomy of which is known, is left open.—*B. W. Wells.*

2498. Bugnon, P. **Sur la ramification dichotome dans les cotylédons. [On the dichotomous branching of cotyledons and their veins.]** Compt. Rend. Acad. Sci. Paris 174: 1194–1196. *6 fig.* 1922.—From this study of *Mercurialis*, *Eschscholtzia*, and *Raphanus* to detemine their ancestral characters, the author believes a cotyledon character to be ancestral if it appears during embryonic development; if it does not seem to constitute a special adaptation of the cotyledon, if it does not appear in the vegetative leaves of the same plant; or if it was present in the adult leaves of ancestral plants.—*C. H. Farr.*

2499. Bugnon, P. **Sur l'hypocotyle de la Mercurialis. [On the hypocotyl of Mercurialis.]** Compt. Rend. Acad. Sci. Paris 174: 954–957. *Fig. 1–2.* 1922.—The conductive apparatus in the embryo of *Mercurialis annua* was studied. There is a longitudinal intercalary growth in the hypocotyl and at the base of the cotyledons, which explains the transitory character of the primary vessels which develop there. These facts are discussed in their bearing on the theory of seedling development put forward by Chauveaud.—*C. H. Farr.*

2500. Campbell, Douglas H. **The gametophyte and embryo of Botrychium simplex Hitchcock.** Ann. Botany 36: 441–456. *Pl. 16, 10 fig.* 1922.—The gametophyte and embryo of this species, the smallest of the genus, are described in detail and compared with those of the other species. The gametophyte closely resembles that of *B. lunaria*, differing chiefly in the smaller development of rhizoids and less conspicuous endophytic fungus. The embryo also resembles that of *B. lunaria*, but differs in the following points: the early divisions are much more variable and irregular, in this respect resembling those of *B. virginianum;* the apical bud is much better developed; the apical cell of the stem is not tetrahedral but has a truncate base like that of *B. obliquum;* and the cotyledon is much more important. The vascular system of the young sporophyte is made up exclusively of steles belonging to the roots and leaves.—*W. P. Thompson.*

2501. Cookson, Isabel C. **Floral abnormalities in the genera Eriostemon and Glossodia.** Proc. Roy. Soc. Victoria 33: 32–38. *1 pl., 4 fig.* 1921.—Four abnormal plants of *Eriostemon obovalis* Cunn. are described. The abnormal flowers had petals of normal color, but a small outgrowth containing pollen occurred on the ventral surface of many of them. The tip of the lamina was generally incurved, forming a hood around the anther. Other floral characters were normal. An extreme type of abnormality was observed less often in which the lamina of the petal is modified to form a somewhat stamen-like filamentous structure with a small expanded distal portion on which a more complex anther was placed. The structure of petal and another from unopened buds is described in detail and was found to vary somewhat.—Three plants of *Glossodia major* R. Br. possessed 2 labella and abnormal perianth segment arrangement. One showed 6 perianth segments, the 3 outer calyx lobes being similar to the 2 lateral corolla lobes in size, shape, and color. The median anterior petal formed a lip. Another specimen had a median flat petal indistinguishable from the laterals and had also 2 lips, the position of which suggested that they were due to the modification of 2 missing stamens. In a 3rd specimen the median lip was replaced by a flat petal which had fused with 2 lateral sepals to form a compound lobe.—*Eloise Gerry.*

2502. Dupler, A. W. **A bisporangiate sporophyll of Lycopodium lucidulum.** Bot. Gaz. 74: 331–332. *1 fig.* 1922.—An instance of 2 small sporangia appearing at the base of a single sporophyll is reported. The writer suggests as explanations the very early sterilization of the archesporial tissue or the appearance of 2 distinct groups of initials.—*B. W. Wells.*

2503. Engler, A. **Beiträge zur Flora von Afrika XLIX. Ueber die eigenartigen Blütenverhältnisse der Gattung Endodesmia Benth.** [**Contributions to the flora of Africa XLIX. On the peculiar floral conditions in the genus Endodesmia.**] Bot. Jahrb. 57: 645–648. *1 fig.* 1922.—The author describes the occurrence of stamens in bundles, stating that in the Guttiferae the bundles arose by fusion, not by fission as is generally supposed. The peculiar swollen receptacle beneath the ovary of the normal flowers is described, also certain abnormal flowers probably produced by gall insects. In the abnormal flowers the stamens are separate and the receptacle is enlarged above, not below, the sepals.—*K. M. Wiegand.*

2504. Gordon, Mary. **The development of endosperm in cereals.** Proc. Roy. Soc. Victoria 34: 105–116. *Fig. 1–9.* 1922.—The development of the aleurone layer and the starchy endosperm was traced in barley, wheat, and oat ovules and found to be practically identical in the 3. The first endosperm cells are derived from the secondary nucleus of the embryo-sac. Nuclei pass to walls of the embryo-sac, form a lining layer, and became enclosed by cell walls. The single layer of lining cells assumes the character of a cambium and produces segment cells on its inner surface. These enlarge, remain thin-walled, become packed with starch, and form the starchy endosperm. After the cells of the endospermic cambium cease to divide they become filled with aleurone grains and the cell walls thicken; this is then the aleurone layer. Its greater respiratory activity and the presence of vitamines in it are the natural results of its being a resting cambium.—*Eloise Gerry.*

2505. Junge, Heinrich. **Eigenartige Blütentriebe eines Asparagus Sprengeri.** [**Peculiar flowering-stalk of Asparagus Sprengeri.**] Möllers Deutsch. Gärt. Zeitg. 37: 253. *1 fig.* 1922.—A 4-year-old well-developed plant produced from its center 6 entirely leafless upright flowering stems, though some of the normal overhanging leafy stems also formed flowers.—*J. C. Th. Uphof.*

2506. Jurica, Hilary Stanislaus. **A morphological study of the Umbelliferae.** Bot. Gaz. 74: 292–307. *Pl. 13–14.* 1922.—This paper, which brings together the morphological studies on the Umbelliferae (84 references cited), deals with the embryo-sac development and stages subsequent thereto in *Sium cicutaefolium* and *Eryngium yuccifolium.* After taking all characters into consideration, the writer states: "The complete cyclic arrangement of floral members associated with definite numbers, the single integument, the anatropous ovule, the

absence of parietal tissue of the megasporangium, the small nucellus, and the complete tetrad of the megaspores of the Umbelliferae, all of which are general characters of the Sympetalae in contrast to those of the Archichlamydeae, from which the Umbelliferae stand so stiffly apart, prove that the Umbellales in reality belong among the Sympetalae." Within the latter group the writer believes they should be placed parallel to the Rubiales in such manner as to indicate a common origin for both groups.—*B. W. Wells.*

2507. Nicolas, G. **Des synanthies, à propos du Narcissus Tazetta L.** [**On synanthy, especially in Narcissus Tazetta.**] Compt. Rend. Acad. Sci. Paris **174**: 1126–1128. 1922.—This instance of teratology is carefully described and used as confirmation of the ligular theory of the crown of the Narcissus blossom. It is concluded that all cases of synanthy, syncarpy, and fasciation, and all anomalous characteristics of non-dissociation and of concrescence of buds, are not due to an excess of nutrition, but to deficient nutrition.—*C. H. Farr.*

2508. Nishimura, Makoto. **Comparative morphology and development of Poa pratensis, Phelum pratense and Setaria italica.** Japanese Jour. Bot. **1**: 55–85. *4 pl., 53 fig.* 1922.—Germination and the development of root and shoot, inflorescence and embryo were studied. Marked differences were noted in rate and percentage of germination, *Setaria* exceeding the others in both. The characteristic hairs developed at the tip of the coleorhiza are described. *Poa* and *Phleum* (both perennials) develop compact stools the 1st season but *Setaria* (an annual) forms only a single leafy culm. In the 2nd season each shoot of *Phleum* produces a stout, corm-like body which is lacking in *Poa*. Plants sown from seed at different dates during the growing season differ markedly in many features. Development of the root system was studied and various differences noted between the 3 genera; all are shallow rooted, and 2 roots are usually associated with each bud. The root-hair zone frequently extends over the whole root and the hairs may last into the 2nd season. The inflorescence is developed in all cases from a vegetative cone through the production of a series of lateral, spike-forming primordia. The embryo develops normally but polyembryony occurs somewhat commonly in *Poa*. Abnormal ovaries frequently appear following the stings of an insect.—*E. W. Sinnott.*

2509. Oelkers, Friedrich. **Entwicklungsgeschichte von Monophyllaea Horsfieldii.** [**Development of Monophyllaea Horsfieldii.**] Beih. Bot. Centralbl. I Abt. **39**: 128–151. *Pl. 15, 12 fig.* 1922.—The seed germinates in 14–21 days after ripening. The young seedling shows 2 equal cotyledons which later become unequal. The root develops exogenously from the end of the hypocotyl, but the lateral roots develop endogenously. The development of the inflorescence and ovules is described. The egg and synergids are as usual, but it was not determined whether antipodals are present or whether the polars fuse. Pollen development is normal. The diploid chromosome number is 32. Double fertilization takes place. The young undifferentiated embryo has a large haustorium; later 2 equal cotyledons develop.—*L. Pace.*

2510. Pammel, L. H., and C. M. King. **The germination of some trees and shrubs and their juvenile forms.** Proc. Iowa Acad. Sci. **27**: 75–80. [*Fig. 10–11.* 1920.—Figures and descriptions are given of the seedlings (cotyledons and first leaves) of *Populus deltoides, Ulmus racemosa, Berberis macroacantha, B. laxiflora oblanceolata, Citrus decumana, Ampelopsis hetcrophylla, Ptelea trifoliata, Nyssa sylvatica, Diospyros virginiana,* and *Fraxinus americana.*—*H. S. Conard.*

2511. Pohl, Franz. **Zur Kenntnis unserer Beerenfrüchte.** [**Our berry-fruits.**] Beih. Bot. Centralbl. I Abt. **39**: 206–221. 1922.—The fruits of several species of *Ribes* are described in some detail. The development of berry-fruits from the arillus is rare. *Taxus* and *Podocarpus* have fleshy arilli, as does the cactus. The fruit of *Garcinia* is developed largely from the arillus, but the origin of that of *Podophyllum* needs further investigation. *Ribes* shows considerable variation in the relative amount of the fruit coming from the arillus. This structure produces the greater part of the berry in *R. nigrum, R. aureum,* and *R. alpinum,* but

the pericarp forms the greater part in *R. rubrum*, *R. gracile*, and *R. canescens*. In the large pericarp berry of *R. grossularia* the arillus is much reduced. It is not easy to decide whether the pericarp or the arillus type of berry is the older.—*L. Pace.*

2512. Printz, H. **Det vegetative skuds anatomiske bygning hos Phelipaea lanuginosa. C. A. Meyer.** [**The anatomy of the vegetative sprout in Phelipaea lanuginosa.**] K. Norske Videnskab. Selskab. Skrifter **1921**: 1–49. *Pl. 1–4, fig. 1–31.* 1922.—The external features of *Phelipaea lanuginosa* are typical of the *Orobanchaceae*. The morphological features of this species are here discussed. Surrounding the vascular bundles a sclerenchymatic sheath is often developed which is very different in different individuals, and in the opinion of the author is an adaptional phenomenon and can not be used for specific distinctions as previously supposed. The stomata are numerous for a parasitic plant, and their position is also remarkable. In some, the guard-cells lie at the same level as the epidermis, but in others they are elevated high above the cells of the epidermis. The 2 kinds may occur together, and it is probable that they serve different purposes. Starch is found in the guard-cells, but chlorophyll is absent throughout the whole plant. The trichomes are different from those previously described for the family, as they are composed of a row of long, cylindrical, thin-walled living cells. The cells of the epidermis, and often also of the outer layers of the bark, are destroyed rather early and form a very effective obstacle to transpiration. The veins are collateral and in this respect differ from other related plants in which the veins are reported to be hadrocentric. The short and vermiform roots possess little or no geotropical sensitiveness. Two roots are occasionally connected by means of haustoria, which are anatomically similar to those which unite the plant with its host. There is also a tendency toward reciprocal accretion between the roots, but in this case only epidermis and bark are united. These 2 phenomena are probably due to the same cause, probably a kind of contact stimulation. [A German résumé is appended.]—*K. Münster Ström.*

2513. Schmidt, E., und E. Graumann. **Zur Kenntnis pflanzlicher Inkrusten. I. Mitteilung: Methode zur Reindarstellung pflanzlicher Skelettsubstanzen.** [**Contributions to our knowledge of plant incrustations. I. Methods for the purification of skeletal plant substances.**] Ber. Deutsch. Chem. Ges. **54**: 1860–1873. 1921.—A method is presented by means of which the skeletal substance (cellulose) of plants can be separated from incrustations (e.g., lignin).—*Henry Schmitz.*

2514. Sears, Paul Bigelow. **Variation in cytology and gross morphology of Taraxacum. II. Senescence, rejuvenescence and leaf variation in Taraxacum.** Bot. Gaz. **73**: 425–446. *Fig. 1–9.* 1922.—The author believes that variations arising from senescence and from ecological causes constitute characters which have often been used in creating species. He shows that "while bracts and achenes are conceded to afford critical characters, the leaves are actually given great weight in spite of their variability." In inducing leaf variations senescent and rejuvenescent changes are prime factors. "Senescence produces a steadily increasing degree of dissection and frequently of hairiness; rejuvenescence restores the unsegmented juvenile seedling form." Changes toward senescence are not correlated with absolute leaf area, total xylem duct capacity in successive leaves, mean xylem duct capacity in successive leaves, ratio of total capacity to leaf area, or number of vein islets per unit area. A definite increase of the carbohydrate-nitrogen ratio is related to senescence. "The time of seeding may govern time of flowering and rejuvenation: this in turn may affect degree of dissection in plants at flowering time." Thus "pure stands of distinctive variants in certain cases may be explained by environmental control of seed germination time." Fluctuations in plant parts other than the leaves are in many cases due to ontogenetical and environmental conditions, but for the most part to unknown causes. It is held that a considerable number of published species are merely variants of *T. vulgare* and *T. laevigatum* caused by the interplay of the various factors operating in senescent change and in the environment.—*B. W. Wells.*

2515. Sinnott, E. W., and I. W. Bailey. **The significance of the 'foliar ray' in the evolution of herbaceous angiosperms.** Ann. Botany 36: 523–534. *Pl. 18–19, 1 fig.* 1922.—The authors had previously expressed the opinions that the chief anatomical concomitant of the change from the woody to the herbaceous habit is simply a progressive thinning of the woody ring, that herbaceous stems are essentially similar in structure to their woody ancestors, and that the woody ring of many-bundled herbs is dissected by high multiseriate rays which are not subtended by woody elements. These conclusions have been attacked by Jeffrey and Torrey, who hold that a new structure, the foliar ray, subtended by woody elements (traces) has made its appearance in the evolution of woody herbs from trees or shrubs and that these woody or transitional herbs have given rise in turn to more herbaceous types by the loss of the confronting portion of the ray and a downward extension of its flanking portions. After clearing up certain misapprehensions and reaffirming the correctness of their original observations, the authors present evidence to show that (1) the 'foliar rays' include several distinct structures, (2) many trees possess foliar rays and are therefore in the first annual ring precisely comparable to herbs, and (3) many herbs have no foliar rays but a continuous vascular cylinder. They conclude that their critics' hypothesis is not tenable because (1) it cannot explain the origin of herbs with continuous cylinders and (2) it involves the evolution and subsequent loss of a transitional structure when the facts are more easily and simply explained without such an assumption.—*W. P. Thompson.*

2516. Soueges, René. **Embryogénie des Rosacées. Les premiers stades du développement de l'embryon chez le Geum urbanum L.** [Embryogeny of the Rosaceae. The first stages in the development of the embryo of Geum urbanum.] Compt. Rend. Acad. Sci. Paris 174: 1070–1072. *Fig. 1–15.* 1922.—A detailed description and figures are given of the stages in development of this species. Some points of similarity are found between its embryogeny and that of *Capsella Bursa-pastoris.* [See also following entry.].—*C. H. Farr.*

2517. Soueges, René. **Embryogénie des Rosacées. Les derniers stades du développement de l'embryon chez le Geum urbanum L.** [Embryogeny of the Rosaceae. The later stages of development of the embryo of Geum urbanum.] Compt. Rend. Acad. Sci. Paris 174: 1197–1199. 1922.—A new type of embryo development akin to that of *Myosotis hispida* is reported. [See also preceding entry.]—*C. H. Farr.*

2518. Thoday, D. **On the organization of growth and differentiation in the stem of the sunflower.** Ann. Botany 36: 489–510. *Pl. 17, 10 fig.* 1922.—In the primary leaf-trace bundles the whole of the xylem originates from a cambium which arises near the inner margin of the procambial crescent. The bulk of the crescent differentiates as phloem. New bundles are interpolated between the primary ones. The transverse growth of a leaf-trace is correlated with that of its leaf and not that of the internode as a whole. Though the xylem portions of the entering leaf-traces remain independent, the strands of the phloem which accompany them connect laterally with those of adjacent bundles, thus making a shorter circuit for the movement of food. Secondary growth is at first due to the cambium of "synthetic traces" which communicate directly with the expanding upper leaves. This growth is in large part tangential, so that the pith becomes distended and often hollow. Meantime the cambium in the mature leaf-trace bundles remains inactive for a considerable time and only gradually resumes growth. The mode of growth is the same in all parts of the stem as in the basal internode. The differences in appearance are due merely to the fact that the upper regions represent an earlier phase in ontogeny, and to the larger scale of the primary tissues in the upper part. Phylogenetic inferences with respect to the origin of herbs as adduced from a comparison of the base with the upper parts are not justified.—*W. P. Thompson.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. Transeau, *Editor*

L. H. Tiffany, *Assistant Editor*

(See in this issue Entries 2328, 2329, 2557, 2636, 2637, 2638, 2668, 2671, 2727, 2769, 2783, 2846)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

(See also in this issue Entries 2320, 2331, 2846)

2519. Anonymous. **Hepatics.** Moss Exchange Club Sec. II Rept. [Bewdley] **1917:** 14–18. 1918.—The Hepaticae distributed during 1917 numbered 67 species and included *Prionolobus striatulus*, new to Wales. The specimens were all collected in the British Isles except 8 from Switzerland. In a few instances D. A. J[ones] has contributed critical remarks.—*A. W. Evans.*

2520. Anonymous. **Hepatics.** Moss Exchange Club Sec. II Rept. [Bewdley] **1918:** 22–25. 1919.—The specimens of hepatics distributed in 1918 include 57 species and were all collected in the British Isles. A few critical notes by D. A. J[ones] accompany the report.—*A. W. Evans.*

2521. Anonymous. **Hepatics.** Moss Exchange Club Sec. II Rept. [Bewdley] **1919:** 21–27. 1920.—Of the 89 species of hepatics listed in the 1919 distribution, 3 came from Switzerland, 2 from Italy, and the others from the British Isles. D. A. J[ones] has commented on a few of the specimens.—*A. W. Evans.*

2522. Anonymous. **Mosses.** Moss Exchange Club Sec. II Rept. [Bewdley] **1917:** 8–13. 1918.—The specimens of mosses distributed during 1917 included 76 species; with the exception of 3 from Switzerland, all came from the British Isles. A few critical notes are contributed by D. A. J[ones], G. B. S[avery], W. R. S[herrin], and J. A. W[heldon].—*A. W. Evans.*

2523. Anonymous. **Mosses.** Moss Exchange Club Sec. II Rept. [Bewdley] **1919:** 8–21. 1919.—Of the 176 species of mosses listed in the 1918 distribution, 17 came from Switzerland, 1 each from Bavaria, Canada, Italy, and Salzburg, and the others from the British Isles. The critical notes interpolated throughout the list are by J. Amann, D. A. J[ones], G. B. S[avery], W. R. S[herrin], and J. A. W[heldon].—*A. W. Evans.*

2524. Anonymous. **Mosses.** Moss Exchange Club Sec. II Rept. [Bewdley] **1919:** 8–20. 1920.—The mosses listed as having been distributed in 1919 include 150 species. Of these 14 were collected in Switzerland, 3 in Italy, 1 each in France, Poland, Salzburg, and Tirol, and the others in the British Isles. Critical notes on certain of the specimens are by E. R[ilstone], D. A. J[ones], G. B. S[avery], W. R. S[herrin], and J. A. W[heldon].—*A. W. Evans.*

2525. Anonymous. **Notes.** Bryologist **25:** 93–94. 1922.—There are noted the deaths of Egidio Corti and of Abbé Faurie, the sale of collections from the Zoologische-botanische Gesellschaft of Vienna, and the appearance of fascicle 19 of J. M. Holzinger's Musci Acrocarpi Boreali-Americani, with a list of the species included in the fascicle.—*E. B. Chamberlain.*

2526. Britton, Elizabeth G. **On some mosses from the Blue Mountain of Cuba.** Bryologist **25:** 89–90. 1922.—An annotated list of 6 somewhat uncommon mosses from the summit of Pico Torquino, Cuba, is given; 3 of the species are new to the island.—*E. B. Chamberlain.*

2527. Dixon, H. N. **The mosses of the Oxford University expedition to Spitzbergen, 1921.** Bryologist 25: 86–89. 1922.—This is an annotated list of 18 species and varieties of mosses, 5 of the species representing additions to the known flora of Spitzbergen. There is a summary of previous publications on the Spitzbergen mosses, and descriptive notes on a number of the species are included. *Bryum globosom* Lindb. var. *ruberrimum* from Klaas Billen Bay is proposed as new, and a 3rd locality for *Calliergon sarmentosum* var. *fontinaloides* Berggr. is noted.—*E. B. Chamberlain.*

2528 Dixon, H. N. **Note on a form of Pottia Heimii from Greenland.** Bryologist 25: 92–93. 1922.—The author describes a specimen of the moss *Pottia Heimii* Fuernr. from Ata, Greenland, which shows a combination of characters usually pertaining to distinct varieties of this species. He concludes that the material should be classified as a form approaching var. *obtusifolia* (R. Br.) Hag.—*E. B. Chamberlain.*

2529. Dunk, Kurt von den. **Monographie des Leuchtmooses (Schistostega osmundacea Web. et Mohr).** [Monograph on the luminous moss.] *8vo, 57 p., 4 pl.* Inaug. Diss. Frankfurt am Main, 1921.—The author discusses the moss from various points of view, including: taxonomy and history of the species; features of the protonema, including the lens-cells and the gemmae; origin and morphology of the leafy stems; heliotropism of the sterile shoots; branching and production of sexual organs by the fertile shoots; development and structure of the sporophyte; nature of the habitat and geographical distribution; bryophytes usually associated with the species. The following are the more important of the conclusions reached: the significance of the lens-cells has been overestimated; spindle-shaped gemmae represent the only type produced; both the male and female inflorescences can branch, this process being especially frequent in the male inflorescence; the dioecism of the species manifests itself in the leafy shoots only and not in the protonema; moisture and a fairly dim light are necessary for the development of the plants; the species grows on a variety of substrata, preferring sandstone and avoiding lime; and its distribution is in the Temperate Zone of the Northern Hemisphere, its altitudinal range extending from 30 to 1400 m. The plates illustrate morphological and anatomical features.—*A. W. Evans.*

2530. Dupler, A. W. **Early embryogeny of Reboulia hemisphaerica.** Bot. Gaz. 74: 143–157. *47 fig.* 1922.—According to the author's observations the fertilized egg in *Reboulia hemisphaerica* soon gives rise to a filament of 4 cells usually separated by transverse walls. The next divisions are commonly vertical, each cell except the basal forming a tier of 4 cells. Even in the early stages variations frequently occur and the walls may be oblique rather than transverse or vertical; in fact an apical cell cutting off a few segments is sometimes evident in the upper part of the young sporophyte. In all probability the epibasal cell, formed by the 1st division of the egg, gives rise to the capsule only, as in most Marchantiales, while the hypobasal cell gives rise to the stalk and foot. There is no absolute proof, however, that the epibasal cell may not contribute to the stalk region as in the Jungermanniales. Neither is it certain that the 1st periclinal walls in the upper portion cut off the future capsule-wall from sporogenous tissue, although this is probably the case. The author makes frequent allusions to the recent studies of Haupt and Woodburn [see Bot. Absts. 4, Entry 1045], as well as to the older literature, and concludes, from the variations in early embryogeny, "that *Reboulia* is a plastic form, and as such may occupy a genetic position among the Hepaticae."—*A. W. Evans.*

2531. Evans, Alexander W. **Recent studies on certain species of Riccia.** Bryologist 25: 81–86. 1922.—Transitional forms, whose thalli in width and in the structure of the air chambers break down the differences upon which *Ricciella* is maintained as a genus distinct from *Riccia,* make it advisable to consider the 2 groups as but a single genus. The status of the plants called *Riccia fluitans* L. appears to be in doubt. Evidence at present known is conflicting as to whether the plants represent a real species, an aquatic form of a single species, or an aggregate of the aquatic forms of several species. The author summarizes papers by

Torka, Donaghy, von Gaisberg [see Bot. Absts. 11, Entry 464], and Familler [see Bot. Absts. 6, Entry 1207], which detail cultural experiments and field observations upon the question of the relationships between *R. fluitans, R. canaliculata, R. Huebeneriana, R. pseudo-Frostii,* and *R. Sullivantii,* and points out the absence of conclusive data in many cases. There is need for more critical research upon the question and for controlled cultural experiments. The bibliography lists nine titles.—*E. B. Chamberlain.*

2532. Fleischer, M. [Rev. of Brotherus, V. F. **Musci Weberbaueriani. (Weberbauer's mosses.)** Bot. Jahrb. 56: 1–22. 1920 (see Bot. Absts. 6, Entry 1906).] Hedwigia 63: (Beiblatt) 6. 1922.—The reviewer speaks of the great interest, from the standpoint of plant geography, of the European mosses which the author reports from the Peruvian Andes. Among such species he cites the following: *Bryum bimum, Distichium capillaceum, Hygroamblystegium filicinum,* and *Splachnum ampullaceum.*—*A. W. Evans.*

2533. Harris, G. T. **The moss flora of Sidmouth and neighbourhood.** Trans. Devonshire Assoc. Adv. Sci. Lit. and Art 50: 561–582. 1918.—The region investigated is mostly comprised within a distance of 5 miles from the town of Sidmouth in East Devon and had previously received less attention than the other parts of Devonshire. The altitudinal range extends from the sea level to a height of over 800 feet. The varied features of the district and the characteristic mosses found in the various kinds of habitat are described in considerable detail, and the paper gives also a "census list of the moss flora," in which 201 species are enumerated, with data regarding frequency and often with the indication of definite stations. In a few cases critical or morphological remarks are added. Six varieties of mosses collected at Dartmoor and representing new county records are reported, 1 being *Hypnum falcatum* Brid. var. *delicatulum* Dixon, described as new.—*A. W. Evans.*

2534. Hurst, C. P. **North Somerset mosses.** Jour. Bot. 56: 268–270. 1918.—The author gives a report on a collection of mosses which he made during the winter of 1916–17 near Burnham-on-Sea, Somerset, England. He enumerates 38 species, varieties, and forms, giving full data regarding localities and, in several cases, including critical remarks. Of the mosses collected 7 represent new vice-comital records.—*A. W. Evans.*

2535. Luisier, A. **Les mousses de Madère (suite).** [**Madeiran mosses.**] Brotéria Sér. Bot. 20: 76–106. 1922.—The present instalment contains keys to the genera and species of the families Polytrichaceae to Brachytheciaceae, with references to the author's earlier articles [see Bot. Absts. 8, Entry 1265; 9, Entry 1507; 10, Entry 1840].—*E. B. Chamberlain.*

2536. Thériot, I. **Leptobryum Escomeli Thér. sp. nov.** Bryologist 25: 90–92. 1922.—The new species of moss here described and figured is from near Arequipa, Peru, and is based on material collected by E. Escomel and R. S. Williams. It is most closely related to *Leptobryum Wilsoni* Broth., figures of which are given for comparison.—*E. B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*

D. S. Welch, *Assistant Editor*

(See also in this issues Entries 2311, 2321, 2322, 2577, 2582, 2584, 2589, 2598, 2611, 2616, 2620, 2668, 2683, 2700, 2750, 2769, 2785, 2844, 2846)

FUNGI

2537. Berger, E. W. **Another apparently new entomogenous fungus from the hammock.** Proc. Florida State Hort. Soc. 35: 68–71. 1922.—*Aschersonia basicystis,* an orange-colored fungus, was found in a hammock at Winter Park, Florida. This fungus was collected inde-

pendently by C. A. Reese and E. W. Berger, infecting unidentified white fly larvae on *Ilex opaca*. The existence of this fungus on a native fly in Florida is of considerable interest.—*J. C. Th. Uphof.*

2538. Cavadas, C. S. **Étude morphologique, histologique et cytologique d'une mycocécidie provoquée chez l'Urtica dioica L. par le Puccinia Caricis (Sch.) Rebent. [Aecidia of Puccinia Caricis on Urtica dioica.]** *16 p., 3 pl., 2 fig.* Faculté Sci.: Nancy, 1922.—In the pseudoperidium around the aecidiospores of *P. Caricis*, the so-called "sterile cells" of Grove are considered equivalent to the uninucleate cells differentiating from the basal cells at the bottom of the young aecidia. The cells of the pseudoperidium are considered homologous to the aecidiospores. The mycelium has a solvent action on pectic and lignified walls; attacked cells react through hyperplasia or hypertrophy, and their nuclei swell or divide either by mitosis or amitosis.—*J. Dufrénoy.*

2539. Duff, G. H. **Development of the Geoglossaceae.** Bot. Gaz. **74:** 264–291. *Pl. 8–12.* 1922.—The author presents the significant stages related to the development of the ascocarp and to sexuality of *Cudonia lutea, Spathularia velutipes, Trichoglossum hirsutum*, and *Leotia lubrica*. He finds in the Helvellineae a morphological situation involving the veil which finds a parallel in the Baeomyces group of disco-lichens; this is adduced as evidence of relationship. Fructification in *Cudonia* and *Spathularia* is initiated by "generative hyphae" which give rise to the procarps from which the ascogenous hyphae spring. The procarp of *Cudonia* bears a trichogyne, a structure lost in *Spathularia*. Further reduction characterizes the other genera. Progressive reduction of the sex organs has characterized evolutionary progress. In this latter regard also the Geoglossaceae are in close correspondence with the Baeomyces group of disco-lichens.—*B. W. Wells.*

2540. Курсанов, L. [Kursanow, L.] **Морфологитеския и4, итоогиlтеския изследования вгруППе Uridineae. [Morphological and cytological investigations in the Uredineae.]** *228 p., 151 fig.* Moscow. 1915.—A considerable part of this work consists of the author's studies of the development of the rusts not having aecial forms, 18 species having been investigated. *Uromyces scutellatus, U. laevis, U. Alchemillae, U. Ficariae, Puccinia Fergussoni, P. suaveolens, P. Rossiana, P. Aegopodii, P. Arthemisiae, P. Asarina, P. Allii, P. Iridis, P. Helianthi, Triphragmium Ulmariae, Chrysomyxa Abietis, C. Pirolae, Melampsora* sp., *Hyalopsora Polypodii-Dryopteridis*. He discusses in detail the morphological significance of the mutual relationship of the various types of spores in this group and explains their evolution and the questions of sexuality. In the study of the aecial fructification, in addition to the manner of formation of the first binucleate cells, he takes into consideration the time of their appearance, the general structure of the fructification, the formation of the sterile pseudoparenchyma and the relation of the latter to the sterile cells (Blackman's trichogynes). The types of aecial fructification are arranged in a series at one extreme of which is placed *Aecidium* and at the other *Caeoma*. *Aecidium* represents the primitive type, the simpler form of *Caeoma* having resulted through a regressive evolution. An interesting parallelism is observed between the aecia and the primary uredinia and telia in brachy, micro, hemi, and other shortened cycles. The shortened cycles are the more recent, the primary uredinia and telia developing instead of the lost aecial fructification possessed by the primitive forms. The author gives a detailed analysis of the data upon which is based Blackman's theory that the fruiting cells are differentiated female cells. It is shown that the presence of the continuous fruiting layers in the primary fructification cannot be considered as exclusively characteristic of sexual cells. Similar layers are present also in the secondary sori (*Puccinia Helianthi, Triphragmium*, etc.). The actions of the nuclei are also not exclusively characteristic of the sexual nuclei. Finally, unstability of the sterile cells, dependence of their formation upon outside conditions, their connection with the sterile tissues (*Peridermium, Aecidium*), and their presence in the secondary sori (*Triphragmium, Puccinia Iridis*, Melampsoraceae), oppose the point of view that these sterile cells are atavistic organs of morphological significance. The author considers the sexual process in the present

day Uredineae as a purely apogamic phenomenon to which could be applied the term pseudomixis of Winkler; and he draws a scheme of the evolution of the sexual process which begins with a hypothetical sexual form and ends with a purely apogamic modern aecium. The development of the peridium in different types of aecia is studied. Experiments to demonstrate functioning of the spermatia gave negative results (*Melampsora Rostrupii*). Reduction division was found (*Coleosporium Tussilaginis*) to deviate from the ordinary; that is, in the stage of meta-anaphasis, there are 16 chromosomes.—*S. Satin.*

2541. Martin, G. W. **The mycoplasm theory.** [Rev. of: Eriksson, Jakob. (1) **The mycoplasm theory, is it dispensable or not?** Phytopathology **11**: 385–388. 1921 (see Bot. Absts. 11, Entry 2870). (2) **The life of Puccinia Malvacearum Mont. within the host plant and on its surface.** Phytopathology **11**: 459–463. 1921 (see Bot. Absts. 11, Entry 2869). (3) **Das Leben des Malvenrostpilzes (Puccinia Malvacearum Mont.) in und auf der Nahrpflanze. (The life of Puccinia Malvacearum Mont. in and on the host plant.)** Handl. K. Svensk. Vetenskapsakad. **62**[5]: 1–190. *Fig. 1–31.* 1921.] Bot. Gaz. **74**: 337–338. 1922.—The reviewer points out that "the widespread opposition to the mycoplasm theory is based on the feeling that the facts may ultimately be accounted for satisfactorily without the theory."—*B. W. Wells.*

2542. Salvat, P., et M. Fontoynont. **Contribution à l'étude des Mycoses malgaches. Abcès sous-dermiques dus à l'Endomyces Molardi (n. sp.).** [**Contribution to the study of Madagascar mycoses. Sub-dermal abscess due to Endomyces Molardi n. sp.**] Bull. Soc. Path. Exotique **15**: 311–320. *Fig. 1.* 1922.—The authors describe a new case of mycosis at Tananarive. There are large numbers of infections of fungous origin in the tropical and subtropical regions. Many of these are contracted in the warm moist coast regions, and continue to develop even when the carrier attains a higher altitude and a cool, or at least a temperate, climate. The symptoms of the disease are described and its cure in the course of about 2 months by the application of methylene blue.—The culture of the organism is simple. Inoculations were made directly from the abscess after washing with hydrogen peroxide followed by sterile water. Growth is good on most common media, but best on carrot-glycerin, glycerin-gelatine, and unneutralized lactose bouillon. The different forms of the parasite should be studied on liquid media, since the round or oval forms and the filaments are hard to find on solid media. The growth and appearance of the organism on different media are described at considerable length. Its appearance varies according to the medium and the age of the culture. Usually several forms are to be seen together with a predominance of one or another. The filaments are cylindrical, simple or branched, of considerable length, 2–6 μ in diameter, and sometimes constricted at the septa. The septa are irregularly spaced, generally closer together at the distal ends. Some hyphae have a thick wall, while in others it is very delicate. The younger hyphae have finely granular protoplasm, easily stained; the older become vacuolate, and are not easily stained by the analin stains. The filaments may be terminated (1) by a long cell, (2) by a chain of small thick-walled cells, yeast-like in appearance, or (3) by large spherical thick-walled chlamydospores 8–22 μ in diameter. Chlamydospores may be terminal, or they may occur on short side branches or even on the side walls of a filament. Chlamydospores and yeast-like cells frequently may be seen separated from the filaments in groups or isolated. Endospore-like bodies in chains in a filament were also observed. The yeast-like cells may bud and produce filaments or chains of cells like themselves. Certain old cultures developed asci which were spherical or elliptical, were only lightly stained, and contained 4 or rarely 8 ascospores. All the stages of the organism are shown in the figure. Experiments with guinea pigs are described. The authors consider this to be a new pathogenic Endomyces, close to but different from *E. albicans* Muguet, and propose the name *Endomyces Molardi.*—*G. H. Godfrey.*

2543. Sartory, A., et L. Maire. **Compendium Hymenomycetum. Fasc. I. Amanita. *24 p., 2 pl.*** Le François: Paris.

2544. Torrend, C. **Les polyporacées du Brésil (suite).** [Brazilian polypores (continued).] Brotéria Sér. Bot. 20: 107–112. 1922.—This installment includes the 9 species of *Lignosus* recognized as occurring in Brazil, with brief descriptions, notes upon collections, and an analytic key. The author also discusses several tropical forms that should be compared with Brazilian forms, without venturing any opinion as to their identity. [See also Bot. Absts. 8, Entry 1314.]—*E. B. Chamberlain.*

LICHENS

2545. Fry, E. J. **Some types of endolithic limestone lichens.** Ann. Botany 36: 541–562. *Pl. 31, 9 fig.* 1922.—This is a study of certain lichens which grow embedded in limestone. The structure of the thallus is similar to that of sub-aerial forms. A classification based on thallus structure is given. In regions of special growth where there is rapid solution of the limestone, numerous spherically inflated hyphae containing oil are found. In slower growing regions oil globules are found in ordinary hyphae. The oil is a waste material. The carbon dioxide of respiration dissolves the rock by forming the soluble bicarbonate. This is precipitated at the surface of the thallus as stable carbonate, causing the granular appearance of the surface of the thallus.—*W. P. Thompson.*

2546. Sampaio, Gonçalo. **Materiais para a liquenologia portuguesa.** [Materials towards a Portuguese lichen flora.] Brotéria Sér. Bot. 20: 147–163. 1922.—A much annotated list is given of 60 species or varieties of lichens, representing additions to the flora of Portugal or new facts in distribution. Descriptive notes accompany most items. There is 1 new combination, *Catillaria Lightfootii* (Sm.) Samp. (*Biatorina*), and 3 forms are proposed as new, viz: *Verrucaria Carrissoi, Polyblastia exiguua,* and *Lecidia flavigrana,* all of Sampaio.—*E. B. Chamberlain.*

BACTERIA

2547. Almquist, Ernest. **Variations and life cycles of pathogenic bacteria.** Jour. Infect. Diseases 31: 483–493. 1922.—Studies upon mutation in *B. typhosus, Sp. cholera, B. diphtheria,* and *Microc. Thulini* when exposed to a considerable range of experimental conditions are reported. Numerous references are also made to the literature upon the subject and space is given to the consideration of the present terminology.—*R. V. Allison.*

2548. Breed, Robert S. **Some problems in the nomenclature of bacteria.** [Abstract.] Absts. Bact. 6: 484. 1922.—*Bacterium* as a generic name is not justified on nomenclatorial grounds. Breaking up of the colon-typhoid group into distinct genera will soon eliminate the name. *Erythrobacillus* of Fortineau has for its type *E. pyosepticus,* not *E. prodigiosus* Ehren. The first valid name for the red chromogenic rods is *Serratia* of Bizio and the type is *S. marescens.*—*D. Reddick.*

2549. Dubovsky, Bertha J., and K. F. Meyer. **An experimental study of the methods available for the enrichment, demonstration and isolation of B. botulinus in specimens of soil and its products, in suspected food, and in clinical and in necropsy material.** Jour. Infect. Diseases 31: 501–540. 1922.—Methods for the enrichment and demonstration of *B. botulinus* are described in detail. Emphasis is laid upon the possible danger of laboratory contamination. The methods applicable for examination of suspected food and clinical and necropsy material are also described in full.—*R. V. Allison.*

2550. Dubovsky, Bertha J., and K. F. Meyer. **The distribution of the spores of B. botulinus in the territory of Alaska and the Dominion of Canada. V.** Jour. Infect. Diseases 31: 594–599. 1922.—These studies show that the organism has not been demonstrated in the coast land soil of the Aelutian Archipelago. *B. botulinus,* type A and occasionally type B, has been cultivated in moraine, glacier, and mountain soil collected around Lake Louise in the Canadian Rockies. Likewise soil samples obtained from the provinces of Prince Edward Island, Nova Scotia, Quebec, Ontario, and British Columbia have furnished positive cultures.—*R. V. Allison.*

2551. Dubovsky, Bertha J., and K. F. Meyer. **The occurrence of B. tetani in soil and on vegetables. VIII.** Jour. Infect. Diseases **31**: 614–616. 1922.—The spores of *B. tetani* are frequently encountered in well manured, cultivated, or garden soil, and on vegetables obtained from Switzerland, China, and several states east of the Mississippi. In the U. S. A. even virgin forest soil has yielded cultures of *B. tetani*. The soil of the western states is relatively free from this anaerobe.—*R. V. Allison.*

2552. Hucker, G. J., and W. A. Wall. **The use of agar slants in detecting ammonia production by bacteria and its relation to the reduction of nitrates.** [Abtsract.] Absts. Bact. **6**: 485. 1922.

2553. Meyer, K. F., and Bertha J. Dubovsky. **The distribution of B. botulinus spores in California. II.** Jour. Infect. Diseases **31**: 541–555. 1922.—Examinations from widely separated groups of soils, vegetables, fruit, etc., showed *B. botulinus* to be very widely distributed. Evidence is found upon which the authors base the suggestion that the natural habitat of the organism is in the virgin field and forest.—*R. V. Allison.*

2554. Meyer, K. F., and Bertha J. Dubovsky. **The distribution of the spores of B. botulinus in the United States. IV.** Jour. Infect. Diseases **31**: 558–594. 1922.—A study of widely scattered samples from every state except Virginia shows that *B. botulinus* is a common anaerobe in the soils of the western states of the Cordilleran System. It is less frequently found in the Atlantic States, the Great Plains, and the Mississippi valley. The spores of the organism were found to be much more numerous in the virgin and pasture soils than in dirt, soil, or manure obtained from animal corals, etc.—*R. V. Allison.*

2555. Meyer, K. F., and Bertha J. Dubovsky. **The occurrence of spores of B. botulinus in Belgium, Denmark, England, the Netherlands and Switzerland. VI.** Jour. Infect. Diseases **31**: 600-609. 1922.—*B. botulinus* has been demonstrated in soil and vegetable specimens collected in all of the countries mentioned. Type A has been consistently absent. While the spores are widely distributed, they are neither numerous nor very resistant to heat.—*R. V. Allison.*

2556. Rosen, H. R. **The bacterial pathogen of corn stalk rot.** Phytopathology **12**: 496-499. 1922.—A brief description is given and the name *Pseudomonas dissolvens* is suggested for the organism causing a stalk-rot of corn (*Zea mays* L.).—*B. B. Higgins.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

(See also in this issue Entries 2338, 2873)

2557. Bell, W. A. **A new genus of Characeae and new Merostomata from the Coal Measures of Nova Scotia.** Trans. Roy. Soc. Canada (3) **16**[4]: 159–167. *Pl. 1.* 1922.—The author describes undoubted oogonia of **Palaeochara,** a new genus of charophyte characterized by having 6 instead of 5 investing cells and constituting the most ancient known undoubted member of this group.—*E. W. Berry.*

2558. Benson, Margaret. **Heterotheca Grievii the microsporange of Heterangium Grievii.** Bot. Gaz. **74**: 121–142. *Pl. 4–5, fig. 1–8.* 1922.—Sporangia are described from the Pettycur deposits of the Calciferous Sandstone Series of Scotland (Lower Carboniferous) associated with *Heterangium Grievii.* The sporangia resemble *Telangium Scottii,* but have distinctive characters which do not justify their inclusion in that form genus. The differences between *T. Scottii* and *Heterangium Grievii* are: Each peripheral loculus of *Telangium* is represented in *Heterotheca* by a series of relatively small loculi; central loculi as well as peripheral ones occur in the new form; the absence of any evidence that the sporangia of *Hetero-*

theca underwent apical dehiscence; the sporangia of *Heterotheca* contain a new form of water storage tracheids; the sporangia of *Heterotheca* retain the twofold cortical sclerotic plates which are characteristic of the cortex of *Heterangium* stem and petiole.—The author regards the last feature as irrefutable evidence of the safe reference of these microsporangia to *Heterangium Grievii*, with which they have invariably been found associated. Although the sporangium has the same claim to the name of the parent plant as either stem or petiole, the author proposes to refer to it under the name of *Heterotheca Grievii*. The anatomical structure of the new sporangia is discussed and illustrated. The author comes to the conclusion that the structure of *Heterotheca Grievii* is strongly confirmatory of the homology of seed and synangium, and is regarded as supplying ample proof of the synangial origin of the seed. She seems to stand in this investigation upon the threshold of the origin of at least one group of Spermatophyta, and she hopes that the conclusions reached cannot fail to have their influence on other groups. This theoretical discussion is made clearer by a series of figures showing transverse sections of various Pteridosperm ovules and pollen sacks.—The author examines carefully the resemblance between *Heterotheca Grievii* and various ovules and microsynangia which are regarded as homologous with it, especially with *Sphaerostoma ovale*. She is convinced that these 2 form genera represent the microsporangium and the ovule of the same species and that the 2 structures are homologous, both being transformation products of a common ancestor. She also believes in the homology of microsporangia and ovules in the case of all the other Lagenostomales, such as *Lagenostoma*, *Conostoma*, and *Physostoma*.—Turning from the Lagenostomales to the Trigonocarpeae, she asks if they bear any internal evidence of origin from such a type of synangium as *Heterotheca*, and concludes that there is a considerable sum of evidence in support of the homology of the Pteridosperm seeds with a microsynangium such as *Heterotheca*.—*A. C. Noé.*

2559. Berry, Edward W. **Tertiary fossil plants from the Republic of Haiti.** Proc. U. S. Nation. Mus. **62**: 1–10. *1 pl., 1 fig.* 1922.—A small Miocene coastal flora from the Republic of Haiti is described. The species *Pisonia conditi* and *Guettarda cookei* are common to the Miocene of the Dominican Republic in the eastern half of the Island, and the following are described as new: *Chara Woodringi, Gymnogramme Woodringi, Simaruba haitensis, Mespilodaphne hispaniolana, Mimusops praeparvafolia, Chrysophyllum cahobasensis*, and *Bumelia cuneatafolia*.—*E. W. Berry.*

2560. Berry, Edward W., and W. A. Johnston. **Pleistocene interglacial deposits in the Vancouver Region, British Columbia.** Trans. Roy. Soc. Canada (3) **16**[4]: 133–139. *Pl. 1–2.* 1922.—An account is presented of Pleistocene interglacial beds near Vancouver with the identification of the following fossil plants: *Salix Barclayi* Anders (?), *S. myrtilloides* L., *Populus* sp., *Arctostaphylos* sp., *Kalmia glauca* Ait, *Chamaedaphne calyculata* (L) Moen., and *Vaccinium ovalifolium* J. E. Smith.—*E. W. Berry.*

2561. Engelhardt, H. **Die Alttertiär Flora von Messel bei Darmstadt. [The early Tertiary flora from Messel near Darmstadt.]** Abh. Hess. Landes. **7**[4]: 21–128. *Pl. 1–40.* 1922. This is a posthumous publication, edited by Menzel, of the veteran paleobotanist of Dresden. A large flora of 359 nominal species is described from Messel in Hesse, with the following composition: 1 fern, 1 cycad, 9 conifers, 12 monocotyledons, 323 dicotyledons, and 13 Phyllites, Carpolithes, and Leguminosites. The facies is intermediate between Eocene and Oligocene and is considered to indicate an upper Eocene age. The abundance of Moraceae, Lauraceae, Apocynaceae, Sapotaceae, Myrtaceae, Celastraceae, Sapindaceae, and Leguminosae give this flora a subtropical character and indicate considerably warmer climatic conditions at the time it flourished than prevail at the present time in corresponding latitudes. The plants show predominating affinities with the existing floras of the East Indies, Australia, Central and South America. The following are the new species: *Podozamites eocaenica, Amomum tertiarium, Piper europaeum, Macropiper rotundifolium, Quercus lineari-lanceolata, Ficus undulata, F. angustifolia, F. lauroides, F. laurifolioides, F. eocaenica, F. populifolia, F. ovatifolia, F. subdimidiata, F. ovato-lanceolata, F. messelensis, F. daphnogenoides, F. ovalifolia, F. rotundifolia,*

F. orbicularis, F. callosaeoides, Laurelia tertiaria, Laurus messelensis, L. Friedrichi, Persea lanceolata, Litsea chattia, Sassafras primigenioides, S. subdimidiatum, Oreodaphne eocaenica, Cinchonidium acuminatifolium, Morinda tertiaria, Ixora tertiaria, Notelaea prisca, Apocynophyllum ellipticum, Echites ? tenuifolia, Alstonia eocaenica, Nerium eocaenicum, N. germanicum Neritinium Ungeri, Vitex ? pentamera, Catalpa Spiegeli, Myrsine semiserrulata, Maesa europaea, Archras protosapota, Sapotacites eocaenicus, S. Schottleri, S. sideroxylonoides, Mimusops ballotaeoides, M. versimilis, Chrysophyllum elongatum, Diospyros ebenoides, Bacca diospyroides, Styrax eocaenica, S. ovatifolia, Gaultheria germanica, Hedera pristina, Knema tertiaria, Magnolia grandifolia, M. pristina, M. multinerris, M. laurioides, Bombax Lepsii, Sterculia cinnamomifolia, S. grandifolia, Pterospermum chattanum, P. Steueri, Grewia microcoides, G. tenuifolia, Tetrapteris messelensis, Banisteria tertiaria, Sapindus lanceolatus, S. firmifolius, Thouinia occidentalis, Staphylea germanica, Celastrus illicinoides, Elaeodendron obovatifolium, Pittosporum eocaenicum, Pomaderris lanigeroides, P. grandifolia, Carya hickoryaeformis, Rhus ternata, R. longifolia, Anaphrenium europaeum, A. lanceolatum, Mangifera tertiaria, Melastoma tertiarium, Eugenia Heeri, Tristania laurinoides, T. tertiaria, Callistemon lanceolatum, Myrtophyllum incertum, M. myrciaefolium, Acmena floribundoides, Phaseolites eocenica, Dolichos ?pristina, Hardenbergia macrophylloides, Machaerium muticoides, Cercis grandifolia, C. parvifolia, Bauhinia europaea, Caesalpinia mediocrifoliola, Copaifera tenuifolia, Leguminosites trigonellaeformis, L. cassioides, Mimosites Spiegeli.—E. W. Berry.

2562. Principi, P. **Flora Messeniana di Polenta in Provincia di Forli. [Messinian flora of Polenta in the province of Forli.]** Riv. Ital. Palaeontol. 28: 5–19. *Pl. 1.* 1922.—The following Mio-Pliocene species are recorded from this locality: *Sequoia Langsdorfii, Phragmites oeningensis, Carpinus pyramidalis, Fagus Antipofi, F. dentata, Castanea entymodrys, C. Scarabelli, C. proteifolia, Populus mutabilis, Planera Ungeri, Acer controversum, Platanus deperdita, Terminalia pannonica, Cercocarpus Minischalchii, Sophora europaea, Cassia phaseolites, C. Fischeri.* All are well known species of the late Tertiary of Europe.—*E. W. Berry.*

2563. Principi, P. **Nuovo contributo allo studio delle Tallofite, Pteridofite, Gimnosperme e Monocotiledoni fossili del giacimento Oligocenico di Santa Giustina e Sassello en Liguria. [New contribution to the study of the fossil Thallophyta, Pteriodphyta, Gymnospermae, and Monocotyledonae of the Oligocene of Santa Giustina and Sassello in Liguria.]** Mem. Com. Geol. Ital. 7: 1–90. *Pl. 1–7.* 1921.—This work completes the description of this extensive and important Oligocene flora, the many dicotyledons from which were described by the same author 2 years previously. The present work treats of 5 algae, 4 fungi, 2 equiseta, 43 ferns, 10 gymnosperms, and 58 monocotyledons from these localities. The specific lines are very finely drawn and often based upon very incomplete specimens. The following are described as new: *Fucus antiquus, Equisetum grande, Adiantum oligocenicum, Pteris protogaea, Asplenium Laurenti, A. Schimperi, Aspidium gracile, Goniopteris, minuta, G. Heeri, Cyperus antiquus, Arecites longus, Phoenicites Isseli, Palaeospathe deVisianii, Palmophyllum Engelhardti, Irites grandifolium.—E. W. Berry.*

PATHOLOGY

Frederick V. Rand, *Editor*
Lillian C. Cash, *Assistant Editor*

(See also in this issue Entries 2229, 2238, 2243, 2249, 2271, 2275, 2281, 2314, 2320, 2337, 2352, 2357, 2358, 2359, 2360, 2366, 2372, 2377, 2385, 2403, 2404, 2412, 2417, 2422, 2435, 2436, 2448, 2461, 2465, 2469, 2483, 2490, 2494, 2495, 2496, 2503, 2508, 2512, 2538, 2540, 2541, 2542, 2556, 2719, 2730, 2773, 2782, 2783, 2785, 2787, 2788, 2789, 2807, 2809, 2890, 2894, 2895)

DISEASES CAUSED BY FUNGI

2564. Anonymous. **Potato trials at Ormskirk.** Nature 110: 431. 1922.—Tests upon 2,500 stocks are being made in 1922 with reference to resistance to wart disease (*Synchitrium endobioticum*). It is evident that rainfall has a considerable effect, the disease appearing earlier and being more pronounced in 1922 than during the dry summer of 1921.—*O. A. Stevens.*

2565. Anonymous. **Root disease of coffee in India.** Tropic. Life 18: 107. 1922.—The article is a quotation from: Anstead, R. I. **Root disease of coffee.** Planters' Chron. 17: 286–287. 1922.—The disease is caused by *Hymenochaete noxia* Berk. and is said to arise from rotting stumps and roots of dead jungle and shade trees. The fungus, developing on the decaying roots of trees, later enters the living roots of the coffee bushes and causes death or serious impairment. The trees chiefly concerned in producing infection are white cedar, cinnamon, Bassari, Jack, and Atti. Complete removal of the stumps of any of these trees, or others known to act as host for the disease, from fields devoted to coffee production or designed for that prupose, is the remedy suggested. Infected coffee bushes and roots should be removed and burned, and the ground thoroughly limed.—*H. N. Vinall.*

2566. Anonymous. **White-pine blister rust in the western United States.** U. S. Dept. Agric. Circ. 226. *7 p., 9 fig. (5 colored).* 1922.—"Until very recently our great forests of western white pine (*Pinus monticola*) and sugar pine (*P. lambertiana*) have been free from this disease, *Cronartium ribicola* Fischer, but in the autumn of 1921 the blister rust was found in western British Columbia and the Puget Sound region of Washington."—*L. R. Hesler.*

2567. Barss, H. P. **Destructive rust (Puccinia subnitens Dietel) on spinach in the Northwest [U. S. A.].** [Abstract.] Phytopathology 12: 446. 1922.

2568. Bewley, W. F. **Anthracnose of the cucumber under glass.** Jour. Ministry Agric. Great Britain 29: 469–472. 558–562. 1922.—This is now the most important leaf spot disease of the cucumber in Great Britain, causing heavy annual losses. The overwintering and control of the causal organism, *Colletotrichum oligochaetum* Cav., have been studied, and the following conclusions drawn: The fungus "carries on a saprophytic existence in rotten woodwork, timber, paper, etc., in the glass houses, and thus tides over the winter period. Straw manure from towns constitutes an important source of infection. Infected houses may be cleansed by spraying the interior woodwork during the winter with emulsified cresylic acid. The disease may be controlled during the growing season by employing drastic methods of ventilation, or by alternately spraying the plants with liver of sulphur or lime-sulphur and flour paste, and removing the spotted leaves."—*M. B. McKay.*

2569. Biers, P. M. **Le Polyporus (Ungulina) Inzengae De Not., parasite du peuplier. [Polyporus Inzengae as a parasite of Populus.]** Bull. Soc. Path. Vég. France 9: 166–168. 1922. —This fungus seems to be a wound parasite, destroying the lignin in wood, and causing the trunks to break easily.—*J. Dufrénoy.*

2570. Boyce, J. S. **White pine blister rust in the Pacific Northwest [U. S. A.].** [Abstract.] Phytopathology 12: 448. 1922.

2571. Brown, William. **Studies in the physiology of parasitism. IX. The effect on the germination of fungal spores of volatile substances arising from plant tissues.** Ann. Botany 36: 285–300. 1922.—The author placed the tissues in large Petri dishes, side by side with clean slides carrying aqueous suspensions of spores,—those of *Botrytis cinerea* proving most convenient. In general the effects were more marked when the leaves or tissues were first bruised. The presence of certain plant tissues, such as apple leaves and the leaves of *Ruta*, *Eucalyptus*, etc., increased spore germination. In other cases there was reduced germination or even inhibitation with tissues of potato tuber, onion leaves, or bulb scales. The effect was more easily discernible when the spores were of feeble germinating capacity. Similar stimulating and retarding effects were produced by certain simple chemical substances such as ethyl acetate. A few other fungi behaved as did *Botrytis cinerea.* Experiments proved that the carbon dioxide evolved is not the agent affecting germination. The action is due to volatile substances arising from the tissues. These volatile stimulants were sufficient to increase markedly the parasitic powers of Botrytis spores. It was found that the presence for some time of wet blotting paper in the Petri dishes retarded germination; all

results indicated that this was due to some organism or organisms present on the paper. The effect of these results on mycological technique and on problems of parasitism is discussed.—*W. P. Fraser.*

2572. Carleton, M. A. **Note on the fusarium wilt disease of bananas.** Science **56**: 663–664. 1922.—The writer performed inoculation experiments confirming those of E. W. Brandes, who proved that the so called "Panama disease" of bananas is caused by *Fusarium Cubense* EFS.—Plants growing in pots of sterilized soil and inoculated with pure cultures of *Fusarium Cubense* all contracted the disease, while all checks remained healthy.—*C. J. Lyon.*

2573. Chabrolin, Ch. **Les dépérissements de l'abricotier dans la vallée du Rhône. [Diseases of apricots in the Rhone Valley.]** Bull. Office Regional Agric. Midi 1922[1]: 24–37. 1922.—This most perplexing disease of apricots consists in a total or partial wilting of the trees, which may occur at any period of the year. The phloem tissues of wilted branches show a conspicuous browning and may be infected by various fungi, a Cytospora being chiefly described.—*Coryneum* and *Monilia* are responsible for much loss.—*J. Dufrénoy.*

2574. Chrestian, J., et L. Ducellier. **L'ergot de l'avoine en Algérie. [Ergot of oats in Algeria.]** Bull. Agric. Algérie-Maroc Ser. 2, **28**: 121–138. *2 fig.* 1922.—This article discusses the spread of ergot of oats in Algeria and its attendant danger; the different modes of propagation of the causal fungus; the presence of ergot infection, which may pass unnoticed; the large number of grasses which may act as possible carriers, since the specialization of this ergot on oats alone is not yet demonstrated; the use of clean seed; incineration of refuse after threshing; elimination of ergot of oats in the seed with saline solutions, and the advisibility of this method of treatment in infected regions; and the importance of the destruction of weed grasses in and near oat fields before blossoming time. [See also Bot. Absts. 12, Entry 2579.]—*Frederick V. Rand.*

2575. Darnell-Smith, G. P. **Fungus and other diseases of stone fruits.** New South Wales Dept. Agric. Farmers Bull. 133. *23 p., 15 fig.* 1920.—Popular descriptions and suggested treatments are given for 4 diseases: peach leaf curl (*Exoascus deformans* (Berk.) Fckl.), brown rot (*Sclerotinia fructigena* (Pers.) Schr.), rust (*Puccinia prunispinosae* Pers.), and peach freckle (*Cladosporium carpophilum* Thüm.). The ascigerous stage of brown rot ha snot been noticed as occurring in Australia.—*L. R. Waldron.*

2576. Elliott, John A., and R. F. Crawford. **The spread of tomato wilt by infected seed.** Phytopathology **12**: 428–434. *Pl. 28, fig. 1–2.* 1922.—Seed from tomato fruits that were thoroughly invaded by the wilt fungus (*Fusarium Lycopersici* Sacc.) were saved by the usual method and stored for several months. They were then planted on sterile moist filter paper; and all fungi growing from the seed which resembled *F. Lycopersici* were isolated and studied. The final test in all cases was the ability of the isolated fungus to produce tomato wilt. Approximately 3½ per cent of the seed carried the wilt fungus, which in some cases seemed to have entered the seed coat.—*B. B. Higgins.*

2577. Fawcett, Howard S. **A new Phomopsis of Citrus in California.** Phytopathology **12**: 419–424. *Fig. 1–2.* 1922.—A Phomopsis, resembling *P. Citri* Fawcett, has been found causing a stem-end rot of citrus fruits in California packing houses. Comparison of the 2 fungi in culture and in their ability to attack citrus fruits showed such marked differences that the California fungus is considered a distinct species. It is named and described as *Phomopsis californica* n. sp.—*B. B. Higgins.*

2578. F[oëx], E. **Dépérissement des ormes (Ulmus campestris et autres espèces d'Ulmus). [Dying of elms.]** [Rev. of: (1) Spierenburg, Dina. **Eene onbekende ziekte in de iepen. [An unknown disease of the elm.]** Verslag. en Mededeel. Plantenziek. Wageningen **18**: 1–10. 1918. (2) Schwarz, M. B. **Das Zweigsterben der Ulmen Trauerweiden und**

Pfirsichbäume [Twig blight of elms, weeping willows, and peach trees.] Thesis, Univ. of Utrecht. 1922. (3). Guyot. Note de pathologie végétale. [Note on plant pathology.] Bull. Soc. Path. Vég. France 8: 132–136. 1921 (see Bot. Absts. 11, Entry 2955).] Bull. Soc. Path. Vég. France 9: 200–204. 1922.—Since 1918 elms have died in great numbers in France, Belgium, and Holland. The disease is more severe in young trees than in old, and may cause death of whole or parts of trees. Brown spots appear in the wood and the leaves wither. No organism was demonstrated directly in discolored wood, but in culture a Cephalosporium-Graphium accompanied by bacteria was obtained. Mlle. Schwarz obtained infections with a pure culture of *Graphium Ulmi* inoculated into either wood or bark.—*Lillian C. Cash.*

2579. F[oëx], E. L'ergot de l'avoine en Algérie. [Ergot of oats in Algeria.] [Extract and rev. of: Chrestian, J., et L. Ducellier. L'ergot de l'avoine en Algérie. Bull. Agric. Algérie-Maroc Ser. 2, 28: 121–138. *2 fig.* 1922 (see Bot. Absts. 12, Entry 2574).] Bull. Soc. Path. Vég. France 9: 196–199. 1922.—Ergot can be separated from healthy seed by floating on an 8 per cent solution of nitrate of soda.—*J. Dufrénoy.*

2580. Grinţescu, Ioan. Le noir des blés en Roumania. [The brown rust of grain in Rumania.] Bul. Soc. Ştiinţe Cluj 1: 292–295. 1921.—The author first observed this disease in Rumania in 1920 when it was sent to him from the vicinity of Bucharest. It was reported from other stations in Rumania especially in Banat the same year. In studying the disease the author found that the plants were attacked by 3 species of fungi, *Cladosporium graminis* Cda., *Alternaria tenuis* Nees, and *Fusarium avenaceum* (Fr.) Sacc. The author is convinced from his experiments that the trouble is due to *Fusarium avenaceum;* the other 2 fungi are saprophytic and have a secondary significance. Inoculations with all 3 forms were negative.—*M. Tiesenhausen.*

2581. Guinier, P. La "dorge" ou "chaudron" du sapin. [The burl or canker of fir.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 333–347. *3 pl.* 1922.—Canker-like burls are frequent on trunks of *Abies alba* in the Jura Mountains. They may be annular or unilateral, open or closed, dry or rotted. The wood of these growths has a special structure, the annual rings being sinuous and of irregular width; resinous streaks of bark are often included in the reddish wood. The effect on growth is almost negligible, but the value of the wood is reduced because of the loss of ½-1 m. in the best part of the trunk; the loss in volume is about 5 per cent, in value about 10 per cent. The cankers develop at points where witches' brooms have fallen off. The 2 deformities are caused by successive stages in the development of *Aecidium elatinum*, which has an alternate stage on members of the family Alsineae, *Stellaria nemorum* being the most abundant species in the Jura fir forests. There is no remedy after the canker is formed, but cutting the witches' brooms offers a method of attack for young trees. Fifty per cent of the brooms are less than 7 m. above the ground. The cutting is not expensive, and should be repeated every 5 or 10 years.—*J. Kittredge, Jr.*

2582. Horne, Wm. Titus. A Phomopsis in grape fruit from the Isle of Pines, W. I., with notes on Diplodia natalensis. Phytopathology 12: 414–418. *Pl. 26–27, fig. 1.* 1922.—In a shipment of grape fruit from the Isle of Pines 2 specimens showing a tan colored rot were found. Tissue cultures from one of these gave *Diplodia natalensis.* From the other, cultures of a Phomopsis were obtained. Inoculations, made by placing either mycelium or spores of the Phomopsis on the calyx or on wounded calyx scars of grape fruits held in moist chambers, produced typical stem-end rot. However, the fungus differed from *Phomopsis Citri* Fawcett, both morphologically and in the growth on culture media, sufficiently to be considered distinct. The name *Phomopsis caribaea* n. sp. is suggested.—*B. B. Higgins.*

2583. Horton, E., and E. S. Salmon. The fungicidal properties of certain spray-fluids. III. Jour. Agric. Sci. 12: 269–279. 1922.—To ensure comparable results similar cuttings from a single hop vine (*Humulus Lupulus* L.) were used, and observations made on leaves of similar age. Inoculations were made with the "powdery" conidial stage of *Sphaerotheca*

Humuli (DC.) Burr. To secure complete wetting of the fungus 1 per cent of calcium caseinate was added to the solutions. One leaf at a node was utilized for the "test," the other serving as control. Disodium arsenate containing 0.096 per cent As_2O_5 proved fungicidal and killed patches of leaf-cells underlying the mildew patches but did not otherwise injure the leaf. A solution containing 0.02 per cent As_2O_5 was fungicidal without killing any leaf-cells. Trisodium arsenate containing 0.077 per cent As_2O_5 and dicalcium arsenate containing 0.048 per cent As_2O_5 also proved fungicidal. Dicalcium arsenate in solution containing 0.024 per cent As_2O_5 proved to be barely fungicidal in its action. Tricalcium arsenate containing 0.076 per cent As_2O_5 is fungicidal and a solution of 0.02 per cent has some value; but a solution with but 0.01 per cent of As_2O_5 is practically non-fungicidal. The following constituents of lime-sulphur wash proved non-fungicidal: calcium sulphate, sulphite, thiosulphate, and hydroxyhydrosulphide. However, calcium polysulphide at a strength of 0.11 per cent proved fungicidal. A bibliography of 20 numbers is included.—*V. H. Young.*

2584. Hubert, Ernest E. **A staining method for hyphae of wood-inhabiting fungi.** Phytopathology **12**: 440–441. 1922.

2585. Hungerford, Chas. W. **A fusarium blight of spinach.** [Abstract.] Phytopathology **12**: 447. 1922.

2586. Hydé, Karl C. **Anatomy of a gall on Populus trichocarpa.** Bot. Gaz. **74**: 186–196. *Pl. 6.* 1922.—This paper is concerned with a lateral stem swelling caused by *Macrophoma tumefaciens* Shear on poplar. The gall structure differs from that of the normal stem in the following respects: the rays are multiseriate instead of uniseriate; the xylem elements are greatly distorted; a marked increase in size and number of cells occurs in the gall bark; the amount of suberized tissue is greatly increased; and an abnormally large number of phloem parenchyma cells are formed. The writer believes that the abnormal xylem is incapable of satisfactorily conducting water and solutes to the stem portion beyond the gall. This accounts for its weakening and death.—*B. W. Wells.*

2587. Jones, L. R., and W. B. Tisdale. **The influence of soil temperature upon the development of flax wilt.** Phytopathology **12**: 409–413. *Fig. 1.* 1922.—The seed of a very susceptible variety of flax were planted in cans of soil infested with *Fusarium Lini* Bolley. The cans were placed in soil temperature tanks held at graduated intervals between 12 and 38°C. The percentage of plants which had wilted at the end of a 24-day period was taken as a basis of comparison. The minimum temperature for the development of the wilt disease was about 14°C., the maximum 38°C., and the optimum between 24 and 28°C. This relation of disease to temperature shows close correlation with the development of the fungus in culture.—*B. B. Higgins.*

2588. Kempton, F. E. **Progress of barberry eradication.** U. S. Dept. Agric. Dept. Circ. 188. *37 p., 4 fig.* 1921.—The relation of barberries and Mahonias to the stem rust situation is summarized. The origin, organization, and methods of the campaign are discussed. The results of the campaign are further summarized by years and by states. In 3 years almost all cities, towns, and villages in the 13 states of the eradication area were surveyed. In the farm-to-farm survey an area which approximates 183 counties was covered in the original survey, but the necessary resurvey was made in only a few of these counties.—*L. R. Hesler.*

2589. Leonian, Leon H. **Stem and fruit blight of pepper caused by Phytophthora Capsici sp. nov.** Phytopathology **12**: 401–408. *Fig. 1–2.* 1922.—A hitherto unreported disease of pepper (*Capsicum annuum* L.) is described. On the pods soft decayed spots are produced, which soon dry and become leathery. On old parts of the stem brownish lesions are produced, which usually girdle the stem killing the parts beyond; but on younger parts the pathogen passes rapidly through until halted by the older hard tissues. The disease is produced by a new species of *Phytophthora* which is described as *P. Capsici.* The fungus is carried in seed from diseased pods; therefore seed selection and sterilization are recommended as control measures.—*B. B. Higgins.*

2590. Link, G. K. K., and F. C. Meier. **Anthracnose of muskmelons.** U. S. Dept. Agric. Dept. Circ. 217. *4 p., 1 pl.* 1922.—This is a popular account of the disease caused by *Colletotrichum lagenarium* (Pers.) E. & H., including symptoms, nature of losses, environmental influences, and control.—*L. R. Hesler.*

2591. Link, G. K. K., and F. C. Meier. **Fusarium tuber rot of potatoes.** U. S. Dept. Agric., Dept. Circ. 214. *8 p., 2 pl.* 1922.—The nature, symptoms, and control of the disease caused by *Fusarium* sp. are discussed in a popular manner.—*L. R. Hesler.*

2592. Link, G. K. K., and F. C. Meier. **Late-blight tuber rot of the potato.** U. S. Dept. Agric. Dept. Circ. 220. *5 p., 2 pl.* 1922.—The nature of the damage, occurrence, conditions favoring, and the control of the disease caused by *Phytophthora infestans* (Mont.) de Bary are given.—*L. R. Hesler.*

2593. Link, G. K. K., and F. C. Meier. **Phoma rot of tomatoes.** U. S. Dept. Agric. Dept. Circ. 219. *5 p., 1 pl.* 1922.—Phoma blight and rot, caused by *Phoma destructiva* Plowr., occur most frequently in southern winter-grown tomatoes, i.e., in the crops of California, Cuba, Florida, and Mexico. The main source of infection is the soil; the fungus develops on the vegetative portion of the tomato and later attacks the fruit through injuries in the skin, most frequently at the stem end either through growth cracks or the fruit-stem scar. On ripe fruits there appear water-soaked concave spots which rapidly enlarge but remain more or less circular and concave with brown or black, firm, leathery centers dotted with the black fruiting bodies from which are extruded the slimy whitish spore masses. The fungus attacks the leaves, petioles, and stems. Spots on the leaves frequently begin at the margin as small discolored areas which become brown or black, enlarge, and finally merge into a large blotch of definite outline but irregular shape.—*Lillian C. Cash.*

2594. McKay, M. B. **Thielavia basicola on watermelon in Oregon.** [Abstract.] Phytopathology 12: 445. 1922.

2595. McMurphy, James. **Notes on Synchytrium.** [Abstract.] Phytopathology 12: 442. 1922.

2596. Maneval, W. E. **Germination of teliospores of rusts at Columbia, Missouri.** Phytopathology 12: 471–488. 1922.—The teliospores of several rusts were collected at intervals during the fall, winter, and spring and germinated by floating on the surface of water in covered culture dishes kept at approximately 20°C. The species used in the tests were: *Phragmidium Potentillae-canadensis* Diet.; *Puccinia Asparagi* DC.; *P. Helianthi* Schw.; *P. Menthae* Pers. var. *americana* Burr.; *P. Ruelliae* (B. & Br.) Lagh.; *P. Andropogonis* Schw.; *P. peridermiospora* (Ell. & Tracy) Arth.; *P. Sorghi* Schw.; *P. Sydowiana* Diet.; and *P. Windsoriae* Schw. The teliospores of all germinated in December or earlier. As the season advanced toward spring the percentage of germination increased and the necessary period of incubation decreased.—*B. B. Higgins.*

2597. Moss, E. H. **Observations on two poplar cankers in Ontario.** Phytopathology 12: 425-427. 1922.—A canker, produced by *Dothichiza populea* Sacc. & Briard, was found in a very destructive form on newly planted trees of Lombardy poplar (*Populus nigra* L. var *italica* Du Roi) at Toronto, Canada. This fungus was also found attacking branches of older trees in various localities in southern Ontario. In the neighborhood of Toronto, also, *Cytospora chrysosperma* (Pers.) Fr. has been found attacking *Populus deltoides*, *P. nigra* L. var *italica* Du Roi, *P. balsamifera*, *P. alba*, and *Acer saccharinum*.—*B. B. Higgins.*

2598. Patouillard, M. N. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XII. Quelques champignons saprophytes des arbres à S. Thomé.** [Some fungus saprophytes of trees in St. Thomas.] *p. 9–10, pl. 4–5.* Soc. Tech.

et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—This is an annoted list of the following: *Stemonites splendens* Mg., *Daldinia concentrica* Ces., *Trametes Persoonii* Mtg., *Polyporus ligrosus* Kl., *Hexagona discopoda* Pat. & Har., *Ganoderma fulvellum* Bres.—*Frederick V. Rand.*

2599. Paxton, G. E. **Studies on Helminthosporium species found on cultivated barley in California.** [Abstract.] Phytopathology **12:** 446–447. 1922.

2600. Pole Evans, I. B., and Mary Pole Evans. **Rise in temperature of living plant tissue when infected by parasitic fungus.** Nature **110:** 480–481. 1922.—The writers found a definite rise of temperature in oranges and grape fruit following inoculation with *Penicillium digitatum.* Further account of the experiments is promised.—*O. A. Stevens.*

2601. Poole, R. Frank. **A new fruit rot of tomatoes.** Bot. Gaz. **74:** 210–214. *Pl. 7.* 1922.—Cracking of green and ripe fruit of certain tomato varieties in New Jersey was found to be caused by *Oidium* or *Oospora lactis.* Inoculations of ripe fruit gave positive results. On the fruit the mycelium is prominent and appears as a dense grayish white layer. Slight control was achieved with Bordeaux sprays and dusts. The fungus is widely distributed, being known also on cheeses and decaying vegetables.—*B. W. Wells.*

2602. Raeder, J. M. **A Helminthosporium root rot of wheat in Idaho.** [Abstract.] Phytopathology **12:** 447. 1922.

2603. Raeder, J. M., and Chas. W. Hungerford. **The effect of presprinkling with water upon the efficiency of certain potato seed treatments for the control of Rhizoctonia.** [Abstract.] Phytopathology **12:** 447–448. 1922.

2604. Ramsey, G. B. **Basisporium gallarum Moll., a parasite of the tomato.** Bot. Gaz. **74:** 325–328. *Fig. 1–11.* 1922.—This fungus is reported to induce a soft, red, blister-like lesion near the blossom end of ripe tomatoes. Inoculations on wounded fruit "have shown conclusively that the fungus is strongly pathogenic." On unwounded surfaces negative results were obtained. The fungus grows readily on most nutrient agars.—*B. W. Wells.*

2605. Rast, Loy E. **Control of cotton wilt by the use of potash fertilizers.** Jour. Amer. Soc. Agron. **14:** 222–224. *Fig. 1–3.* 1922.—In 1920 a 5-acre cotton field on alluvial river land near Scott, Arkansas, was destroyed by wilt. A part of the field had been treated with a fertilizer containing 10 per cent phosphoric acid, 3 per cent nitrogen, and no potash. The following year the same fertilizer was mixed with an equal amount of kainit containing 12.5 per cent potash and applied at the rate of 1,000 pounds per acre. On the unfertilized acre used as a check, 95 per cent of the plants died, whereas in the fertilized field there was no noticeable injury.—*Lillian C. Cash.*

2606. Richards, B. L. **Corticium vagum as a factor in potato production.** [Abstract.] Phytopathology **12:** 444. 1922.

2607. Richards, B. L. **Relation of rainfall to the late blight of [?] Phoma rot of the sugar-beet.** [Abstract.] Phytopathology **12:** 443. 1922.

2608. Schmitz, Henry. **Note concerning the decay of western yellow pine slash caused by Polyporus volvatus Peck.** Phytopathology **12:** 494–496. *1 fig.* 1922.—Observations indicate that *P. volvatus* is at least weakly parasitic on western yellow pine.—*B. B. Higgins.*

2609. Smith, Elizabeth H., and Edith H. Philips. **Fig smut studies.** [Abstract.] Phytopathology **12:** 442. 1922.

2610. Stevens, F. L. **A fungus destructive to asphalt shingles.** Phytopathology **12:** 497. *1 fig.* 1922.

2611. Weber, George F. **Septoria diseases of cereals.** Phytopathology **12:** 449–470. *Pl. 29–30, fig. 1–5.* 1922.—This is the 1st of a series of 3 papers on this subject. Except for a brief introduction the paper is devoted entirely to a discussion of "speckled blotch" of oats, which has been collected twice near Madison, Wisconsin. It has been known in Europe since 1895, but has not been reported previously from the U. S. A. The disease is produced by *Leptosphaeria avenaria* sp. nov. (= *Septoria Avenae* Frank). Small, circular to elliptical or elongate, dead, faded lesions are produced on the leaves of the oat plant. The dead areas soon become speckled with the black pycnidia of the fungus. The ascigerous stage has not been found on the host plant, but numerous perithecia with mature ascospores have been found in potato-agar and oatmeal-agar cultures obtained from single pycnospores. The disease has been reproduced by inoculating oat plants with either ascospores or pycnospores from these cultures. Inoculations were also made on various cultivated and wild grasses but infections were obtained only on species of *Avena*. The morphology and the more important physiological reactions of the fungus are described.—*B. B. Higgins.*

2612. Whetzel, H. H. **The pink-root of onions.** Agric. Bull. Bermuda Dept. Agric. **1922:** 4–6. July, 1922.—This disease, caused by *Fusarium mali* Allesch., is reported as very severe in Bermuda and is considered the chief factor in the 50 per cent reduction of the onion crop shown by the official records of yields for the past 10 years. A method of control is suggested.—*H. H. Whetzel.*

2613. Willaman, J. J., and F. R. Davison. **Biochemistry of plant diseases. IV. Proximate analysis of plums rotted by Sclerotinia cinerea.** Bot. Gaz. **74:** 104–109. *Fig. 1–2.* 1922.—Four varieties of plums in 3 stages of maturity were employed. Determinations were made of the ash content, calcium, nitrogen, ether extract, and crude fiber of sound and rotted fruits, the latter proving higher in ash, CaO, nitrogen, and ether extract than sound ones. Further, resistant varieties were conspicuously higher in crude fiber than susceptible ones, but were lower in ash, CaO, nitrogen, and ether extract. During the process of normal ripening there is a decrease of ash, CaO, and nitrogen content due probably to storage of carbohydrates and acids.—*F. A. Wolf.*

2614. Wingard, S. A. **Yeast-spot of lima beans.** Phytopathology **12:** 525–532. *Fig. 1–4.* 1922.—A diseased condition of lima beans (*Phaseolus lunatus* L.,), in which dark brown sunken spots are produced on the seed, has been observed in 7 counties of eastern Virginia. In some lots 60 per cent of the seed showed infection. Numerous isolations from diseased tissue gave pure cultures of a yeast. Inoculations made by spraying green uninjured pods with suspensions of the yeast or smearing uninjured pods with pure cultures of the yeast failed to produce infection; but the disease is readily reproduced by pricking the pods with a needle dipped in a pure culture of the yeast. The organism is considered a new species and the name *Nematospora Phaseoli* is proposed. The same or a similar disease has been collected on black eyed pea (*Vigna sinensis* Hassk.).—*B. B. Higgins.*

2615. Winston, John R. **Commercial control of citrus scab.** U. S. Dept. Agric. Circ. **215.** *8 p.* 1922.—Important facts on the origin and geographical occurrence, importance, susceptibility, overwintering of the causal fungus, and control are given. The organism is usually but erroneously referred to as *Cladosporium Citri* Massee. Plain Bordeaux mixture as well as Bordeaux-oil emulsion is very effective against scab either in the orchard or nursery. Burgundy and ammoniacal copper carbonate, and lime sulphur are less effective than Bordeaux. Schedules for spraying are given for types of localities with regard to severity of the disease.—*L. R. Hesler.*

2616. Wormald, H. **Further studies of the 'brown rot' fungi. A shoot-wilt and canker of plum trees caused by Sclerotinia cinerea.** Ann. Botany 36: 305–320. *Pl. 13, 14.* 1922.—The attack begins on the leaves soon after they are unfolded. The mycelium extends from the shoots into the twigs causing cankers and gummosis of the diseased tissues. Conidia of *Monilia cinerea* (Bon.) Schröter sometimes develop on the dead leaves in wet summer weather, but not on the cankers till the following winter and spring. Inoculation of the leaves on short shoots with a pure culture of the fungus isolated from cankers resulted in infection of the leaves followed by cankers on the twigs. Inoculated apple blossoms were killed but infection failed to enter the axis of the inflorescence since the other flowers and leaves of the same shoot remained healthy. The fungus causing the wilt was determined as *Sclerotinia cinerea* (Bon.) Schröter, forma *Pruni*. This determination was supported by the slow rate of secretion of an oxidase when compared with forma *Mali*. The wilt is compared with wither-tip caused by the same fungus. The direct loss due to this wilt is small, but the cankers may prove a source of infection for the next season.—*W. P. Fraser.*

2617. Zeller, S. M. **A "plum pocket" on Prunus subcordata in Oregon.** [Abstract.] Phytopathology **12**: 443. 1922.

DISEASES CAUSED BY BACTERIA

2618. Fromme, F. D., and S. A. Wingard. **Blackfire or angular-leafspot of tobacco.** Virginia Agric. Exp. Sta. Tech. Bull. 25. *43 p., 2 pl., 18 fig.* 1922.—Following a discussion of the history, range, and economic importance of blackfire (*Bacterium angulatum*) the authors compare symptoms on seedlings and field plants with those of wildfire and other leafspots of tobacco. Laboratory and field experiments and observations on dissemination, development of infection, and control are described. The occurrence of blackfire in the field is determined largely by the occurrence of infection in the plantbed. The pathogen may overwinter on seed, on plantbed cloth, in tobacco refuse, on plants which do not winterkill, and to a slight extent in soil, especially where refuse from the tobacco crop remains on the surface over winter. Severity of infection is modified by rainfall and host nutrition. Rainfall is the chief agency of dissemination and excessive rainfall predisposes the plant to infection by inducing a vigorous, succulent growth. Host nutrition as modified by fertilizers or topping determines severity of infection to a marked degree. Hence, those plants which make the most rapid, succulent, vigorous growth are most subject to severe injury. Contrary to popular belief deficiency in important fertilizer constituents does not predispose plants to severe infection. Apparently all varieties of tobacco grown in Virginia are sufficiently susceptible so that relief through choice of varieties or selection of resistant strains does not seem probable. Complete disinfection of naturally contaminated seed was obtained with a 15-minute soaking in 1: 16 formaldehyde and also with a 10-minute soaking in 1: 1000 mercuric chloride. The latter material is preferred because of lack of seed injury. Seed disinfection should be accompanied by plantbed and field sanitation.—*F. D. Fromme.*

2619. Higgins, B. B. **The bacterial spot of pepper.** Phytopathology **12**: 501–516. *Pl. 31–32, fig. 1–5.* 1922.—The leaves, stems, and fruits of *Capsicum annuum* L. are attacked by a species of *Bacterium*. On the leaves small, pimple-like swellings appear after an incubation period of 10–15 days. These swollen areas soon collapse and die, forming small, circular spots. On stems and fruits small, wart-like lesions are produced. The causal organism is left undetermined. It is very similar to *B. vesicatorium* Doidge and *B. exitiosum* Gardner and Hendrick, which cause similar diseases of tomatoes; but it appears to differ from published descriptions of these 2 organisms in certain physiological reactions. The bacteria are carried on the surface of the seed from diseased pods. Seed treatment gives promise of controlling the disease.—*B. B. Higgins.*

2620. Jones, S. G. **A bacterial disease of turnip (Brassica napus).** Jour. Agric. Sci. **12**: 292–305. *Pl. 3.* 1922.—A disease of root crops in North Wales was found to be prone to appear on soils which had been limed or heavily treated with nitrogenous fertilizers. Casual exami-

nation of a crop of white turnips did not reveal unusual symptoms but closer examination showed the destruction of the young tender leaves of the crown and a flask-shaped, soft, putrid core surrounded by a brown zone abutting on the healthy tissue. In many cases several secondary crowns had taken the place of the original destroyed crown. Farmers reported that earlier stages were seen when the foliage was apparently dead, and that recovery later took place. A rod-shaped organism 1.3–3 × 0.75–0.9 μ with a single polar flagellum was regularly associated with the disease and its pathogenicity was established by appropriate inoculation experiments. The organism was found capable of producing a soft rot in swede, potato, carrot, radish, and cabbage, but no growth occurred on beetroot. Pectinase and diastatic and peptonizing ferments are produced and the medium in which the organism has grown is capable of disintegrating turnip tissue. While the organism has many characters in common with *Pseudomonas campestris* Smith and *Bacillus Oleracea* Harrison, it is clearly more nearly related to *Pseudomonas destructans* Potter and is considered by the author to be a varietal form of the latter.—*V. H. Young.*

2621. Meier, F. C., and G. K. K. Link. **Bacterial spot of cucumbers.** U. S. Dept. Agric. Dept. Circ. 234. *5 p., 1 pl.* 1922.—This is a popular discussion of the disease caused by *Bacterium lachrymans* Smith & Bryan. The symptoms, nature of losses, geographic occurrence, environmental influences, and control are treated.—*L. R. Hesler.*

2622. Olson, George A. **Agricultural gypsum for control of potato scab.** Potato Mag. 5[3]: 7, 23. *1 fig.* 1922.—Application of 800–1,000 pounds per acre at plowing time has eliminated scab (*Actinomyces chromogenus*) and increased the yield rate in California.—*Donald Folsom.*

2623. Snow, Laetitia M. **A new host for the fire blight organism, Bacillus amylovorus.** Phytopathology 12: 517–524. 1922.—Bacteria were isolated from blighted twigs of the flowering plum (*Prunus triloba* var. *plena*). Cultures from 2 such isolations were compared with a stock culture of the fire blight organism (*Bacillus amylovorus*) and with 1 isolated from blighted crab apple twigs. The cultures showed minor differences in physiological reactions and in pathogenicity; but in general they agreed with published descriptions of *B. amylovorus*. A rather extensive historical discussion and a bibliography are given.—*B. B. Higgins.*

2624. Wolf, F. A. **Wildfire of tobacco.** North Carolina Agric. Exp. Sta. Bull. 246. *27 p., 7 fig.* 1922.—This investigation is concerned with leafspot disease of tobacco called "wildfire" which was first definitely recognized in North Carolina in June, 1917. It has subsequently been found in 26 counties within the State. It is now known to occur also in Virginia, South Carolina, Georgia, Florida, Tennessee, Kentucky, Ohio, Wisconsin, Pennsylvania, Maryland, Massachusetts, Connecticut, Vermont, and in several districts in South Africa.—Wildfire appears to come suddenly and may render the crop practically worthless. It produces characteristic leaf spots of which the most constant and dependable character in all stages of development is the wide, yellowish border or halo. Seed pods are also affected.—Wildfire is a specific infection and the organism which causes it has been named *Bacterium tabacum*. This has been proved by repeated isolation from diseased tissues and by infection of healthy tobacco with the germ in pure culture. *B. tabacum* is not known to be actively parasitic on any other crop.—The disease originates in the plant-bed. Such agencies as infected seed, contaminated plant-bed covers, infested soil, and man are responsible for the introduction of wildfire into the plant-beds. It is carried to the field at time of transplanting by the use of diseased seedlings.—Moisture is essential not only for infection, but for the dissemination of the disease. Rainy weather, especially when accompanied by wind, favors the rapid spread of wildfire; new infections do not appear in dry periods. Nutritional factors also influence the progress of wildfire.—The only practical method of control centers around the growing of healthy seedlings. If the seed-beds can be kept free from disease, the fields will be free from it also. Prevention of wildfire in the plant-bed depends primarily upon the use of (1) disease-free seed or seed which has been disinfected, (2) new plant-bed cloths or sterilized old ones, and (3) new plant-beds or thoroughly fired old ones. No satisfactory means of checking the disease in the field is known.—*F. A. Wolf.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

2625. Anonymous. **Gulerods-Krusesyge. [Carrot "Krusesyge."]** Tidsskr. Planteavl. **28:** 62–64. *Fig. 1–3.* 1922.—This is a discussion of a disease of carrots caused by an insect, *Trioza viridula.* Spraying with tobacco extract and petroleum emulsion has given good results.—*Albert A. Hansen.*

2626. Andrews, E. A. **Some notes on attempts to produce immunity from insect attack on tea.** Rept. Proc. Fourth [Pusa] Entomol. Meeting *p. 56–59.* Calcutta, 1921.—The author makes the following statement based on experience and observation: ". . . . comparative immunity from *Helopeltis* attack not only can, but does, occur in nature. In our attempts to produce immunity, we are attempting to discover and reproduce the conditions under which this immunity occurs in nature. The conditions affecting the question are considerably complicated, but would appear to be bound up with the relative proportions of potash and phosphoric acid taken up from the soil by the plant." Analyses of leaves from bushes which in nature were throwing off the disease showed a 4 to 1 ratio of potash and phosphoric acid; the normal ratio is 2 to 1. It thus seems plain to the author that the throwing off of the insect pest is related to a distinct increase in the potash ratio. In direct experiments the only substance producing increased resistance was potash. Attempts to increase liability to attack appear to have failed. No increase in resistance followed in tests with phosphates.—"Mosquito blight" is the name commonly applied to Helopeltis injuries.—*Frederick V. Rand.*

2627. Ballard, E. **Results of investigation of bionomics of Platyedra gossypiella Saunders, in South India, together with some notes on Earias insulana and E. fabia.** Rept. Proc. Fourth [Pusa] Entomol. Meeting *p. 70–83.* Calcutta, 1921.—Damage by the pink boll-worm includes (1) destruction of the seed, (2) retarded development and weakening of the lint, (3) premature opening of the boll leading to invasion by saprophytic fungi, *Nigrosporum,* and others, (4) staining of the lint both in the boll and in the gin, and (5) lowering of germination in unattacked seeds of injured bolls.—Life history studies, amount of damage caused, and control by natural enemies and artificial means are discussed.—*Frederick V. Rand.*

2628. Dufrénoy, J. **Tumeurs chancreuses du pin maritime. [Stem tumors of Pinus maritima.]** Rev. Zool. Agric. et Appl. Coloniale **21:** 25–28. *Fig. 11-13.* 1922.—The wood tissues and medullary rays in tumors due to the injury of the cambium by larvae of *Dioryctria sylvestrella* may become infected by a sterile mycelium.—*J. Dufrénoy.*

2629. Feytaud, J. **Le Doryphore. Chrysoméle nuisible à la pomme de terre. (Leptinotarsa decemlineata Say.) [The Colorado potato beetle.]** Rev. Zool. Agric. Bordeaux **21:** 121–168. *Fig. 27–39.* 1922.—The paper gives a description of the insect, its biology, food plants and damage done, means of dissemination, environmental conditions favorable and unfavorable to it, its distribution in America and in Europe, and its control.—Arsenicals should not be added to Bordeaux mixtures when spraying for this insect as the compound spray has a repellent action. The beetles should be poisoned but not driven away to other fields.—*J. Dufrénoy.*

2630. França, Carlos. **Encore quelques considérations sur la flagellose des Euphorbes. [Some further observations on flagellosis of Euphorbia.]** Bull. Soc. Path. Exotique **15:** 166–168. 1922.—The writer maintains his previous position that *Stenocephalus* is the primary host of *Leptomonas davidi,* the complete proof of which has been doubted by Franchini. He bases his claim on the fact that he has followed the developmental stages of the flagellate in this host. He has been able to see *Stenocephalus,* coming from its hibernation in April and possessing the small salivary forms, easily infect *Euphorbia,* while infection by means of the latex, itself abundantly parasitized, more frequently fails. His position is further strengthened by the coincidence in Switzerland of infection of *Euphorbia* and infected *Stenocephalus* reported by Galli-Valerio.—The writer mentions as well the analogy between the developmental cycles of *Leptomonas donovani,* discovered by Mrs. Helen Adie in the insect *Cimex*

lectularius, in India, and *Leptomonas davidi* Lafont in *Stenocephalus*. The former is a case of the alternate hosts, Hemiptera and vertebrate; the latter, of Hemiptera and phanerogam. The developmental stages of the parasite are practically the same. Attention is called to the appearance of small local lesions at points of inoculation in both cases, the former in connection with the disease Kala-Azar, and the latter with the flagellosis of Euphorbiaceae. [See also Bot. Absts. 12, Entry 2634.]—*G. H. Godfrey.*

2631. Franchini, G. **Amibes et autres protozoaires de plantes à latex du Muséum de Paris (Note préliminaire).** [**Amoebae and other protozoa of latex bearing plants at the Paris Museum.**] Bull. Soc. Path. Exotique **15**: 197–203. 1922.—The writer has pursued his work on the organisms of latex-bearing plants and reports several new Euphorbiaseous hosts, as follows: *Elaeophorbia drupifera* and *Euphorbia calyculata* carried trypanosomes similar to those reported in *E. nereifolia* and *E. virosa*, except that they are smaller and the blepharoplast is more often round instead of rod shaped. Some rare forms with 2 nuclei seemed to be in process of division, and some "U" forms were observed. The latex of *E. calyculata* is less thick than that of the others and this permitted the better observation of amoeboid movements. *Excoccaria emarginata* carried a trypanosome that was generally larger than the others, measuring 10–15 × 3.5–4 μ, with several masses of chromatin in the protoplasm. The flagella were not observed clearly. Degeneration forms were seen. Amoebae were observed among the trypanosomes in all 3 species. In *Euphorbia verticillata* there were no trypanosomes but amoebae alone, which were round, and 10–12 μ in diameter. *Manihot dichotoma* harbored small parasites similar to *Leishmania*. The examination of 8 other *Euphorbia* species gave negative results.—In the family Apocynaceae about 30 species were examined. Amoebae were abundant especially in 4 species of *Strophantus*, and in *Acokanthera*, *Thevetia*, and *Cerbera Odollam*. *Herpetomonas* was found in the last, along with the amoebae. In the amoebae of the Apocynaceae, the protoplasm is thick and sometimes the ectoplasm is well differentiated from the endoplasm. The nuclei vary in number from 1 to 8 or more. The amoebae measured from 6 to 20 μ in diameter, or if oval, 15–25 × 6–10 μ. *Caudrania javanensis* harbored very numerous protozoa with accentuated amoeboid movements. They had the appearance of large trypanosomes without flagella. Each had 1 or 2 nuclei which stained a clear blue by the Giemsa method, and a curved centrosome staining very dark. The plant was in poor condition,—yellow, and with very little latex.—In the Asclepiadaceae, *Chlorocodon Whitei* harbored small amoebae, and *Cryptostegia grandiflora* contained numerous amoebae of all kinds and dimensions, including typical Crithidian forms. The very large forms measured 30–40 × 20–30 μ.—In the Urticaceae several plants of *Ficus* were examined and about a quarter showed amoebae with fine protoplasm. In *Ficus Benjamina* were numerous amoebae and small trypanosomes similar to those of *Euphorbia*. In *Ficus Pierrei* were numerous undetermined amoebae and other parasites. In *F. Tholloni*, which was about half dried up, amoebae and both elongate and leishmaniform parasites without flagella were found. In *F. carica*, a large tree in the open, there occurred a large amoeba which was cultured in Nöller's solid medium. It is probable that this organism overwinters within the tree, since it was found early in March.—In the Artocarpoideae, amoebae in *Antiaris toxicaria* and in *Lakoocha artocarpus* were generally large and mobile, with many vacuoles and no distinction between ectoplasm and endoplasm.—In the Sapotaceae *Labramia Bojeri*, *Tregulia Africana*, and different species of *Chrisophyllon* and *Mimusops* harbored parasites like those in the Artocarpoideae. In *Sideroxylon inerme*, along with the amoebae, were flagellates of the Herpetomonas type. In other species of *Mimusops* were both flagellate forms and large trypanosome-like parasites without flagella.—In the Menispermaceae *Stephania rotunda* var. *succirubra* showed small round and oval parasites. In the Anacardiaceae *Onococarpus vitiensis* showed a small protozoon with 1 or several nuclei. In the Passifloraceae different species of *Carica* gave negative results.—Some of the above plants, especially the more infected, were yellowish and with little latex. Certain species of *Ficus* were in bad condition.—Bits of young branches were fixed in Brazil fluid and stained with thionin and with iron haematoxylin. In the latex vessels were round, oval, or elongate bodies with one or several nuclei, black granules in the protoplasm, and sometimes vacuoles. Some oval forms had rather long flagella. These

studies are being continued.—Culturing fresh latex of *Strophantus Rigali* and *S. scandens* on plates of Nöller's medium (blood gelatin) at 24°C., the author secured a thin grayish growth. This consisted in part of amoebae which were mobile and generally smaller than those in the latex. A transfer gave a very rich culture. Some of the organisms showed red corpuscles in different stages of digestion. Cultures were also obtained with the latex of *Antiaris toxicaria*.—Many of the organisms mentioned in the paper are as yet undescribed. The author considers it necessary to study more of the insects inhabiting the plants, and is directing his studies to certain mosquitoes and large flies (*Lucilia* and *Sarcophaga*). It is hardly possible that *Stenocephalus* (mentioned by França) exists in the conservatory of the Botanical Garden of Paris. The author notes a resemblance between the organisms reported by Adie in *Cimex lectularius* and the latex forms.—*G. H. Godfrey.*

2632. Franchini, G. **Flagellose du chou et des punaises du chou.** [**Flagellosis of cabbage and cabbage bugs.**] Bull. Soc. Path. Exotique **15**: 163–165. *Fig. 1.* 1922.—Cabbage-infesting insects of the family Pentatomidae, principally *Pentatoma ornatum*, *P. ornatum* var. *pectorale*, *P. oleraceum*, and *Aelia acuminata*, collected near Bologna, were examined and all but the last found to harbor in their digestive tracts and more rarely in their salivary glands the flagellates *Crithidia* and *Herpetomonas*. The feces of the insects were rich in flagellates and in leishmaniform cysts. Their larvae were also infested. A large quantity of cabbage was examined and the leaves upon which the insects were most abundant were turning yellow and dying. There was no doubt but that the insects were harmful to the plants. Diseased leaves were washed with distilled water and weak alcohol, and smears made from the expressed juice showed not infrequently the presence of flagellates of the Herpetomonas type. The flagella, rather long, arose in the centrosome which was generally removed from the nucleus, though sometimes adjoining it or even behind it. There were also present irregular forms, such as those minus the flagella, leishmaniform bodies, helicoidal bodies arranged in groups, small slender ones with or without centrosomes, and even encysted forms. The flagellate forms measured 7–15 or even 22 × 1–1.5 μ, flagella generally very long; leishmaniform bodies, oval, 2–6 × 1–2 μ, or when round 2–3 μ in diameter; cysts were 2–3 μ in diameter, or 2 × 1.5 μ. The writer states that it was necessary to wash leaves thoroughly to rid them of superficial forms which he found undoubtedly expelled with the excreta of the insects. He was not able to find in diseased leaves the organism *Pseudomonas campestris* (Pam.) EFS associated with a similar disease called "black nerve of cabbage."—Flagellosis of the cabbage bugs is frequent, that of the cabbage much rarer. The parasite probably penetrates through insect punctures. [See also Bot. Absts. 12, Entry 2646.]—*G. H. Godfrey.*

2633. Franchini, G. **Nouvelles recherches sur les trypanosomes des Euphorbes et sur leur culture.** [**New researches on the trypanosomes of Euphorbias, and on their culture.**] Bull. Soc. Path. Exotique **15**: 299–303. *1 fig.* 1922.—The author, continuing his researches on the protozoa of the latex of Euphorbiaceae and other families, enlarges upon previously mentioned facts, including the finding of very large amoeba-like forms in addition to trypanosomes in *Euphorbia nereifolia*. The trypanosomes, especially the smaller ones, were very mobile, with amoeboid movements. Cultures on plates of Nöller's medium (blood gelatin) permitted observations of all stages of development; these confirmed the previous supposition of intermediate developmental stages between the amoebae and the trypanosomes. The small amoeboid forms increase in volume, the protoplasm becomes differentiated, and as they increase in size the U shape is assumed, sometimes with a thin membrane between the 2 parts. Sometimes this thin vacuolate membrane escapes and the larger amoeboid forms appear. Thus all the different forms were observed in the culture. In some, phagocytosis of the red blood corpuscles was evident. In stained mounts from cultures all the different stages were seen. There were resting stages with large vacuoles and round or oval encysted forms. More rarely the very large trypanosomes occurred. Large forms containing numerous small trypanosomes were also seen. These have already been observed in nature and probably represent an endocellular stage of the parasite. Histological studies of sections of young branches and leaves of *Excoccaria emarginata* apparently confirm this point of view. Tryp-

anosomes occurred in the interior of the host cells, sometimes joined to the nucleus. Their development in host tissues appears quite similar to that in culture. Tube cultures were made from an undetermined Euphorbia by inoculating directly from the latex to the condensation liquid of Yoshida medium. Likewise, transfers from plate cultures of the organism from *Ficus carica* on Nöller's medium were made to large Yoshida tubes, good growth secured, and further transfers made. Several stages were observed in these cultures also, this being the 1st time that cultures from this host have given a trypanosome stage similar to that from the Euphorbiaceae.—*G. H. Godfrey.*

2634. Franchini, G. **Remarques à propos de la note de M. França sur la flagellose des Euphorbes. [Remarks in connection with the note of M. França on flagellosis of the Euphorbias.]** Bull. Soc. Path. Exotique **15**: 205–207. 1922.—The writer repeats that while he does not dispute the statement that in Portugal *Stenocephalus agilis* may transmit the flagellosis of Euphorbias, he does not consider the transmission of the disease to be limited to that insect. He cites the work of others in support of his contention and gives other evidence in the form of measurements of the parasites, staining reactions, etc. França's conclusion that in Switzerland the disease of the Euphorbias is transmitted by *Stenocephalus* is considered not established till further proof is available. [See also Bot. Absts. 12, Entries 2630, 2647.]—*G. H. Godfrey.*

2635. Franchini, G. **Sur une amibe des figuiers de plein air de la région parisienne et sa culture. [On an amoeba of figs growing in the open near Paris, and its culture.]** Bull. Soc. Path. Exotique **15**: 287–292. *Fig. 1–3.* 1922.—The parasites were very abundant in the latex, some having amoeboid movements. In preparations fixed with osmic acid, alcohol-ether, and Schaudinn or Brazil fluid, the organisms were somewhat irregular, as were the various other latex organisms previously studied. The round ones were 12–20 μ or more in diameter; the oval, 18–22 $\times$ 12–13 μ; more elongate forms were 22–28 $\times$ 2–5 μ. The protoplasm was thick, and stained deeply with Giemsa or iron haematoxylin. The nucleus possessed a centriole. From 2 to 18 nuclei were observed in different individuals. The organism did not grow on ordinary culture media, but on Nöller's blood gelatin cultures developed within the medium but not on the surface. In 3 days growth was evident, and in 10–15 days the cultures were well developed, with very numerous amoebae. Frequent transfers were necessary, since the organism grew better on fresh media. In general the amoebae of the cultures were smaller than those of the latex. All stages of multiplication were found. Encysted forms appeared very early. Protoplasmic movement is abundant in culture; only rarely do pseudopodia occur. The organism does not live so well in contaminated cultures. Blocks of gelatin with good growth were fixed in Brazil fluid and imbedded in paraffin; results are not reported. Certain amoebae digested numerous red corpuscles; no ingested bacteria were observed. The organism is very resistant to cold, and overwinters in the interior of the trees. The organism possesses a flagellate stage, which recalls the previously reported transition stages between amoebae and trypanosomes in Asclepiadaceae, Apocynaceae, etc. As to the penetration of the amoebae into the latex of the figs, 2 hypotheses are advanced: (1) penetration from the soil through lesions in the bark, or even through the roots, (2) inoculation by an insect; the latter is the more probable.—*G. H. Godfrey.*

2636. Franchini, G. **Sur un flagelle de Lygaeide (Crithidia oxycareni n. sp.). [On a flagellate of the Lygaeidae (Crithidia oxycareni n. sp.).]** Bull. Soc. Path. Exotique **15**: 113–116. *Fig. 1.* 1922.—The insects (*Oxycarenus lavaterae*) were very numerous on a malvaceous shrub, *Althaea syriaca*. They harbored numerous flagellates of the type *Crithidic* in their digestive tubes and more rarely in their salivary glands and probosces. The activities of the organism and its flagellum are described somewhat in detail. Its protoplasm is granular; the large, roundish nucleus is generally in the middle and the blepharoplast usually some distance from it. In the membrane of 50 per cent of the flagellates, in front of the centrosome, is a clear roundish or oval, feebly colored space (vacuole ?); the blepharoplast is only exceptionally placed in the middle of this space; the flagellum traverses it or passes over

the outer edge. Rhizoplasts, axostyles, or other special bodies were not observed in the protoplasm. Division is longitudinal, beginning with the flagellum, followed by the blepharoplast, and finally the nucleus. The dimensions of the elongate forms were 26–32 × 1.5 μ, free flagellum 4–6 μ long; of the medium forms, 17–24 × 1–2 μ; of the division forms, 10–17 × 2–3 μ; of the large forms without free flagellum, oval, 9 × 5.5 μ, or roundish, 5–6 μ in diameter; and of the small leishmaniform individuals, 2 × 1 μ, or round ones, 1.5 μ in diameter. Many irregularities occur. Some resemble trypanosomes but the blepharoplast is never posterior. The culture of the parasite was never very difficult, the flagellates being very numerous and almost in pure culture in certain insects. On Nöller's medium, after 12–15 days at 25–30° C. there appeared a light grayish scum formed of numerous flagellates mixed with bacteria. After 4 transfers, pure cultures were obtained. Stained preparations show the Crithidia forms to be smaller than when in the intestines of the insect, and less abundant; there occur a large proportion of slightly elongated, leishmaniform, round, or oval forms.—An inoculation was made into a white mouse with organisms taken directly from the digestive tract of an insect, and the mouse, which became very sick, was killed after 24 days. The parasites were to be found in the blood and in various organs.—Studies were made of the leaves, fruits, and bark of *Althaea syriaca*, and the more rounded forms of the parasite were found. Stained smears from the expressed juice of leaves and peels of the fruits likewise showed these forms. Reddish spots were noted on the leaves and bark in connection with deposits of feces of the insects, and it is considered probable that these deposits were the source of infection. The elongate or flagellate forms, less resistant to external agents, disappeared, while the roundish and encysted forms, more resistant to the action of the sun, etc., survived.—*G. H. Godfrey.*

2637. Franchini, G. **Sur un flagellé nouveau du latex de deux Apocynées. [On a new flagellate of the latex of two Apocynaceae.]** Bull. Soc. Path. Exotique **15**: 109–113. *Fig. 1.* 1922.—In 1 of 4 plants of *Funtumia* examined a protozoon was found in the latex of the trunk, the young branches, and the leaves. It was not present in the roots. Specimens were fixed with alcohol-ether, and stained by the "Giemsa" and iron haematoxylin methods. The protozoon was elongate, without flagella or with very short flagellum; nucleus, median, spherical, and often surrounded by a lightly stained, clear zone; blepharoplast, anterior; rarely a rhizoplast. The flagellum arising in the blepharoplast was usually very short, but sometimes longer than the parasite. Besides the elongate or flagellate forms there were roundish or oval forms with different dimensions, sometimes with several chromatic masses in the protoplasm. Some very much elongate division forms with 2 nuclei and 2 centrosomes occur, with a constriction in the middle and the centrosomes toward the center, near the constriction. Some large forms with pale protoplasm, several chromatic masses, and vacuoles, were probably degenerating. Others with thick walls, with nucleus and without centrosome, were encysted. Elongate forms were 7–18 μ long by 1.5–2 μ wide; flagella 3–15 μ long. Small roundish forms were 3–4.5 μ in diameter, or 5 × 4–4.5 μ. Large forms were 8–10 × 5–6 μ, or (roundish) 5–6 μ in diameter.—In addition, special cells enclosed from 2 to 3 or more forms similar to but smaller than those that were free. The cells were 7–15 μ long and 4–10 μ wide.—In *Thevetia nereifolia*, growing in close proximity to the Funtumia at Florence, Italy, a protozoon occurred which was similar to those described in the latter. The flagella were not seen, however, and the elongate forms were more rare. This plant was less parasitized than the other. It is probable that the same insect inoculated both hosts with the parasite. The protozoon probably belongs to Herpetomonas or a closely related genus. The 2 parasitized plants do not seem to suffer from infection, though some time earlier 2 plants died in an unexplained manner.—*G. H. Godfrey.*

2638. Franchini, G. **Sur un trypanosome du latex de deux espèces d'Euphorbe. [On a trypanosome of the latex of two species of Euphorbia.]** Bull. Soc. Path. Exotique **15**: 18–23. *Fig. 1.* 1922.—Organisms were found in the latex of 2 species of *Euphorbia* growing in the botanical garden at Florence (Italy). These organisms were sometimes round and sometimes oval or elongated, with a nucleus and granulations in the protoplasm and without flagella.

In addition, true trypanosomes and a series of other forms were found. It was not possible to study their mobility, since the latex quickly coagulated on exposure to the air. Two types of trypanosomes, large and small, were studied, the former measuring 8–10 × 1–2 μ, the latter 4–8 × 1–1.5 μ. The nucleus was round and generally toward the forward part of the body. The blepharoplast was posterior to the nucleus. The stages of development, shown in the figure, resemble those of *Trypanosoma Cruzi* or of *Cystotrypanosoma intestinalis*, the latter found in a fly. This trypanosome is similar to those described in a number of insects and vertebrates. It appears to be distinct, however, and is named *Trypanosoma Euphorbiae*. In connection with its transmission, a large number of insects were studied. Certain obligate phytophagous insects, which are named, found associated with the 2 species of *Euphorbia*, contained *Herpetomonas* and *Crithidia*, but no trypanosomes. França in Portugal attributes transmission of flagellosis of the Euphorobias to *Stenocephalus agilis*, since he has seen this insect on the Euphorbias and has found flagellates in its intestine, glands, and proboscis. It is probable that in Italy other insects transmit the disease. Certain non-phytophagous or only occasionally phytophagous insects such as flies and mosquitoes often deposit their feces on the leaves, stems, branches, etc. The feces are often rich in flagellates and encysted forms. Some of these forms harbored trypanosomes in addition to *Herpetomonas* and *Crithidia*.—*G. H. Godfrey.*

2639. Ghosh, C. C. **Supplementary observations on borers in sugar-cane, rice, etc.** Rept. Proc. Fourth [Pusa] Entomol. Meeting, *p. 105–136*. Calcutta, 1921.—A large number of species of termites, mole crickets, beetle grubs, beetles, red ants, etc., are discussed in relation to habits and life-histories, amount and character of damage caused, and control.—"Apart from their capacity to cause damage directly, the beetles and beetle grubs and in fact all the external agents of damage are responsible for probably much greater damage indirectly by affording places for entry of fungal diseases through bites on the surface of the stems." In most cases the direct injury consists in boring into or chewing plant parts. In the case of *Pachydiplosis oryzae*, however, the larvae of this small mosquito-like fly feed inside of rice plants and cause the growth of a long, tube-like gall in place of the stem. Affected stems produce no ears.—*Frederick V. Rand.*

2640. Husain, M. Afzol, and Hem Singh Pruthi. **Preliminary note on winter spraying against mango hopper (Idiocerus spp.), vernacular name Tela.** Rept. Proc. Fourth [Pusa] Entomol. Meeting *p. 148*. Calcutta, 1921.—Hoppers that survive the winter move out in early spring from under the bark and cluster on the floral buds where they remain sucking the sap during the growth of the inflorescence. The nymphs, occurring in enormous numbers, are most injurious to the flowers, causing them to shrivel, brown, and finally fall. The attacked inflorescence has a blighted appearance which in severe cases can be seen from a distance. Honeydew falling on the blossoms also causes damage and renders pollination more difficult.—The flowers are too delicate to withstand spray treatment, but winter spraying in the early morning when the hoppers are sluggish will greatly reduce their numbers.—*Frederick V. Rand.*

2641. Jhaveri, T. N. **Notes on cotton wooly mite (Eriophyes gossypii).** Rept. Proc. Fourth [Pusa] Entomol. Meeting *p. 96–97*. Calcutta, 1921.—In the vernacular the disease is known as *chhasia* on account of the ash-like appearance of affected leaves. In years of drought it spreads over wide areas greatly checking the growth of the cotton plant. Affected leaves remain small and curl upward. Checking of the disease in December and January is apparently brought about by the heavy dews of winter. The mites responsible for this disease live mostly under the epidermis of the leaf and cause a dense growth of hairs on both surfaces and on the stem. At an advanced stage of the crop tiny predatory grubs of Coccinellid beetles attack the mites and greatly reduce their numbers. Artificial control is also discussed.—*Frederick V. Rand.*

2642. McCracken, Isabel, and Dorothy Egbert. **California gall-making Cynipidae with descriptions of new species.** Stanford Univ. Publ. Univ. Ser. Biol. Sci. 3[1]: 1–70. *2 pl.* 1922.—Following the 3 introductory pages on the biology of gall-making Cynipidae and of non-gall makers, or Inquilines, the authors give, under each of the 113 species discussed, a brief description of the galls produced and references to type specimens, hosts, and type localities. Where new species are considered descriptions are included. The various species and their hosts are also shown graphically in 2 tables.—*Frederick V. Rand.*

2643. McKay, M. B. **Distribution of Tylenchus dipsaci on wild strawberry in Oregon. Preliminary report.** [Abstract.] Phytopathology **12**: 445–446. 1922.

2644. McWhorther, Frank P. **The nature of the organism found in the Fiji galls of sugar cane.** Philippine Agric. **11**: 103–111. *2 pl., 2 fig.* 1922.—An amoeba, for which the name *Phytamoeba sacchari* is proposed, is reported to be present in the galls of the Fiji disease of sugar cane (*Saccharum officinarum* L.). The organism is described as a small, intracellular, parasitic amoeba, capable of living in a free state in cane-juice cultures. The size is variable, seldom more than 12 μ in diameter. When the amoeba is intracellular, its pseudopodia are short, blunt, and lobose; when extracellular, in culture, the pseudopodia are lobose or pointed. The protoplasm contains granules rather uniformly distributed, with little or no differentiation of ectoplasm. Vacuoles are present, these being more or less contractile in the organism living under extracellular conditions. The nucleus is organized or distributed. When the gall becomes mature, each amoeba is transformed into a single cyst, which is a simple, rounded, smooth-walled structure. The cyst wall is firm but not brittle, and is composed of highly vacuolate material. When germinating, each cyst gradually absorbs its wall and becomes transformed into a motile amoeba. Reproduction takes place by simple fission and by gemmation. In the developing galls, 1–6 amoebae may be present in each host cell; one or more are generally attached to the host nucleus. As the gall continues to develop, divisions of the amoebae accompany divisions of the host nuclei. When the gall approaches maturity, encystment of the amoebae occurs. There is no zoospore stage of the organism; also no coalescing of amoebae to form large plasmodia. Culture of the organism was extremely difficult, but fairly successful cultures were obtained by using juice from a diseased plant for making hanging-drop cultures. In the hanging drop were placed several very thin free-hand sections of galls. In such preparations the cysts germinated into active amoebae and the latter reproduced by fission. That the Fiji disease is caused by *Phytamoeba sacchari* cannot be considered demonstrated conclusively until pure cultures of the organism injected into healthy sugar-cane plants shall have produced the disease under controlled conditions. The evidence that this organism is the cause of the disease is as follows: From the time that the disease first appears, the organism in some stage or other is always present in the developing galls; it is abundant only in the galls, and it cannot be demonstrated in healthy plants.—*Sam F. Trelease.*

2645. Misra, C. S. **Oxycarenus laetus; the dusky cotton bug.** Rept. Proc. Fourth [Pusa] Entomol. Meeting *p. 84–92.* Calcutta, 1921.—This insect not only directly lowers the vitality of the seed and injures the lint but indirectly introduces a host of fungous and bacterial diseases which conjointly reduce the seed vitality to a minimum. Such damaged seeds are lighter in weight, somewhat discolored, and do not produce healthy and vigorous plants.—The adults and nymphs of this insect move freely about over the plant and are particularly active in the bolls, where they attack the seeds for their mucilaginous material. The seed coats in such cases show numerous fine perforations presumably made by the probosces of these bugs. Since this insect does not enter the unopened bolls its worst injuries follow attacks by the boll worm.—Details of life history are followed by an open meeting discussion.—*Frederick V. Rand.*

2646. Roubaud, E. [**Flagellosis of cabbage.**] Bull. Soc. Path. Exotique **15**: 165. 1922.—At Vendée the writer observed this infection of bugs of cabbage 2 years ago and again last

year. Of *Pentatoma ornatum* collected in 1920 and 1921 more than 90 per cent of individuals in all stages were parasitized. Salivary infection was not seen. Infection was searched for in vain in diseased leaves and stems, even those most completely discolored by insect punctures. The author does not believe that one can really speak of flagellosis of cabbage, but rather that the weakened condition of the plants is due to the abundance of insect punctures. [See also Bot. Absts. 12, Entry 2632.]—*G. H. Godfrey.*

2647. Roubaud, [E.] [Flagellosis of Euphorbias.] Bull. Soc. Path. Exotique **15**: 207. 1922.—The author states that he shares Franchini's opinion [see Bot. Absts. 12, Entry 2634] on the subject of the polyxenism of the flagellate *Leptomonas davidi* in Hemiptera and in Euphorbias. [See Bot. Absts. 12, Entry 2630.]—*G. H. Godfrey.*

2648. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. VII. Quelques observations sur le "thrips" du cacaoyer.** [Some observations on thrips of cacao.] *23 p., fig. 25–32.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1919.—*Heliothrips rubrocinctus* Giard is one of the very common species of thrips, but has been known only a few years. In St. Thomas and Principe it has been found parasitizing both avocado and cacao. The author gives its geographical distribution, the plants parasitized, some biological observations including acclimatization, oviposition, and development of larval forms, life-history, classification and description of the species, prophylaxis and control treatments, description of parasitized material used for study, and bibliography.—*Frederick V. Rand.*

2649. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. VIII. Sur une nouvelle espèce du genre Mirotermes appartenant à la faune de S. Thomé.** [A new species of Mirotermes in St. Thomas.] *6 p., fig. 33–40.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1919.—*Mirotermes obtectus* F. Silb. is an earth inhabiting species which builds its nest near the old trunks of trees and which seems to have a secondary agricultural importance, but is interesting from the point of view of morphology.—*Frederick V. Rand.*

2650. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. IX. Les cochenilles du caféier.** [The cochineals of coffee.] *8 p., fig. 41–49.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1919.—The most important of these insects from the point of view of damage caused is *Pseudococcus citri* Risso which attacks not only the leaves and buds of several plants, but also the fruits, branches, large trunks, and roots. It is to the roots that greatest injury results. The waxy flakes forming the secretion which shelters the colonies of this species occur in abundance upon the small trunks and roots of young plants. Species of *Pseudococcus* and *Dactylopus* are very difficult to combat not only on account of this natural protection but also because of their habit of entering fissures in the bark, and of going into the ground to the roots and even to decaying vegetable matter remote from the roots.—Other species discussed are *Ceroplastes* sp., *Ischnaspis filiformis*, *Orthesia insignis* Douglas, *Lecanium viride* Green, *Pseudaonidia trilobitiformis* Green, *Aspidiotus palmae* Morg. & Ckll., and *A. articulatus* Morg.—*Frederick V. Rand.*

2651. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XI. Les grandes espèces d'insectes ravageurs des vieux arbres à S. Thomé.** [The large insects destructive to old trees in St. Thomas.] *8 p., 3 pl.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—The author discusses not only the direct insect injuries but also the relation of these wounds to the entry of cryptogamic parasites. Two families of the order Coleoptera are described.—*Frederick V. Rand.*

2652. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XIV. Le "Toxoptera coffeae Nietner," à S. Thomé (Toxoptera coffeae Thomensis s. sp. n.)** [Toxoptera coffeae in St. Thomas.] *p. 15–18, 9 fig.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—The extremities of the branches, particularly on young plants, are attacked. This insect causes atrophy of the leaves, and the young branches are also severely injured from its depredations.—*Frederick V. Rand.*

2653. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XX. Note préliminaire sur la maladie vermiculaire du caféier à S. Thomé.** [Preliminary note on nematode disease of coffee.] *6 p.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1920.—The preconceived idea that the death of coffee plants in this island is due to cryptogamic parasites of the roots has retarded investigations. It is true that roots of the coffee plant as well as those of cacao, avocado, and other trees will, when left for several days in the field, show a whitish mycelium usually resembling the Rosellinia which attacks trees and particularly the vine in Europe. However, this mycelium may belong to other fungi, especially to saprophytic forms such as the Agaricaceae, etc. It is necessary to determine the species before pronouncing on its possible importance to pathology.—The disease now under discussion is of another order and is due to the nematode *Heterodera* sp. A description of the symptoms, agricultural importance of the disease in St. Thomas, and suggestions for treatment are given.—*Frederick V. Rand.*

2654. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XXII. Le Cosmopolites sordidus Germ. à S. Thomé.** [Cosmopolites sordidus in St. Thomas.] *7 p., 3 fig.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1920.—The larvae of this insect live at the base of the trunk and in the rootsof the banana tree producng numerous galleries which permit water to enter the interior of the plant. Decay produced by the development of parasitic or semi-parasitic cryptogams soon follows.—Several other insects and myriopods are mentioned.—*Frederick V. Rand.*

2655. Seabra, A. F. de. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XXX. Encore le thrips du cacaoyer (Heliothrips rubrocinctus Giard.) à S. Thomé.** [Heliothrips rubrocinctus on cacao in St. Thomas.] *5 p.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1920.—This species is reported on *Claoxylon Molleri* Pax., *Copaifer mapane* Kirk, *Maniot utilissima* Pahlz., *Pseudospondias microcarpa* Engler, *Psidium pomiferum* L., and *Urophyllum insular* Hiern. The symptoms of attack are described for each species of plant.—The use of tobacco as a trap crop is discussed, and it is stated that tobacco not only attracts the thrips but also poisons them.—Thrips are regarded as a potentially formidable enemy of the St. Thomas plantations unless serious attention is paid to a reduction of their natural multiplication.—*Frederick V. Rand.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

2656. Anonymous. **Transmission of sugar-cane mosaic by aphids.** West India Committee Circ. 37. *521.* 1922.—In a Porto Rico cane field 2 large insect-proof cages were erected, each containing 48 plants of a particularly susceptible variety; one half the plants in each cage were diseased, the other half healthy. Aphids were introduced into cage A, while cage B was kept free from weeds and insects. In 3 months 15 of the 24 healthy cane plants in cage A had contracted the disease while in cage B, the healthy plants showed no sign of infection.—*H. N. Vinall.*

2657. Harreveld, Ph. van. **Gelestrepenziekte.** [Yellow-stripe disease (mosaic).] Arch. Suikerindust. Nederland.-Indië **30:** 362–364. 1922.—This article is a discussion and refutation of some of F. Ledeboer's remarks [see Bot. Absts. 12, Entry 2661] in regard to van Harreveld's note on stripe disease [Arch. Suikerindust. Nederland.-Indië **30:** 261–262. 1922]. He repeats that the methods used for control do not have to be changed to any extent. Control

measures were selection of healthy plants in young bibit-gardens and eradication of stripe-diseased plants. Naturally bibit-gardens are kept clear from grasses and weeds from a cultural point of view. Corn and grass are too generally present to make the killing or the exclusion of corn aphids possible.—Strains of cane D. I. 52 and the Chunnee crosses, P. O. J. Nos. 36, 826, 979, 1499, 1507, 1547, and 2379, sometimes become suddenly more than 50 per cent diseased.—In general old methods of control have more value since the discovery that insects can transmit the disease from plant to plant.—*Peter J. Klaphaak.*

2658. Johnson, James. **The relation of air temperature to the mosaic disease of potatoes and other plants.** Phytopathology **12:** 438–440. *Fig. 1.* 1922.—The optimum temperature for the development of potato (*Solanum tuberosum*) mosaic lies between 14 and 18°C. Above 20°C. the mosaic symptoms gradually disappear from diseased plants. At a temperature of 24–25°C. the symptoms disappear entirely in 1–2 weeks.—*B. B. Higgins.*

2659. K[uyper?], J. **Overbrenging van Gelestrepenziekte door insecten. [Transmission of yellow-stripe disease (mosaic) by insects.]** Arch. Suikerindust. Nederland.-Indië **30:** 357–358. 1922.—This article contains a discussion of Kunkel's paper in Hawaiian Planters Rec. **26:** 1922 in which Kunkel mentioned that in confirmation of Brandes' work *Aphis adusta* (*maïdis*) could transmit the disease, while *Aphis sacchari* Zehntn. could not. The former, however, was seldom found on cane, but quite often on grasses present in the cane fields. Some of the grasses mentioned by Kunkel, a few of which are susceptible to the mosaic disease, occur in Java, e.g., *Eleusine indica*, *Panicum colomun*, and *P. sanguinale*. Van der Goot found *Aphis maïdis* also on *Polytrias diversiflora.*—*Peter J. Klaphaak.*

2660. Ledeboer, F. **Gelestrepenziekte. [Yellow-stripe disease (mosaic).]** Arch. Suikerindust. Nederland.-Indië **30:** 359–362. 1922.—After discussing van Harreveld's note on Gelestrepenziekte en Bladluizen [Arch Suikerindust. Nederland-Indië **30:** 261. 1922] the author gives the results of investigations during 1921–1922. It was found that *Aphis sacchari* Zehntner could not transmit the disease, as was at first surmised, but that *A. adusta* Zehntner was a very active carrier, thus confirming Brandes' results. *A. adusta* was found more often than would be expected. Evidence of a real attack is very seldom found, but during the rainy season the insects are found in abundance on several grasses. From these grasses winged individuals go to the cane. *Panicum colonum* L. and *Paspalum sanguinale* Lam. are the most frequent host plants for *Aphis adusta*. Grasses in the neighborhood of stripe-diseased cane are often stripe diseased also, and serve thus not only as hosts for the insects, but also as new sources of infection when stripe-diseased cane has been eradicated.—Control measures are the eradication of stripe-diseased plants, careful weeding in and around the plantation, burying or burning the weeds, and growing of infected cane only in the lowlands where it is more easily controlled. [See also Bot. Absts. 12, Entry 2658.]—*Peter J. Klaphaak.*

2661. McCallan, E. A. **Report of seed potato inspection.** Agric. Bull. Bermuda Dept. Agric. **1922:** 4–7. September, 1922.—The report gives comparative counts of leaf-roll and mosaic in the same stock in Bermuda and Nova Scotia for 1921–1922.—*H. H. Whetzel.*

2662. Murphy, Paul A. **Leaf-roll and mosaic, two important diseases of the potato.** Jour. Dept. Agric. Ireland **22:** 281–284. *Fig. 1–2.* 1922.—The usual symptoms and behavior are described. Capsid bugs and jassids have been proved to transmit leaf-roll in Ireland, and there they apparently are more important in this respect than aphids. Recommended control measures are field inspection for the source of seed, early removal of diseased hills, isolated seed-plots, and avoidance of soil containing diseased tubers and of conditions favoring infestation by transmitting insects.—*Donald Folsom.*

2663. Whetzel, H. H. **The seed potato situation.** Agric. Bull. Bermuda Dept. Agric. **1922:** 2–4. September, 1922.—The Bermuda seed potato problem is presented, with special reference to leaf-roll and mosaic.—*H. H. Whetzel.*

2664. Wilcox, R. B. **Eastern blue-stem of the black raspberry.** U. S. Dept. Agric. Dept. Circ. 227. *12 p.,1 pl.* 1922.—This trouble is apparently not due to a "running out" of varieties; there is no indication of a parasite of any kind, and the probabilities are that the disease is of mosaic type. There is a gradual stunting and reduction of vigor in the affected plant. The shoots become shortened, the upper leaves become curled in a peculiar fashion, and the fruit is inclined to crumble. A uniform mottling of the leaves usually accompanies the change in form. A constant symptom is the discoloration of shoots; this discoloration, an indulin blue (Ridgeway), occurs at or near the surface of the ground and upward for 2 feet or more. The blue coloration is found in the chlorophyll area of the stem. This disease differs from blue-stem in the West [U. S. A.], which shows a wilting of the leaves and a darkening of the canes. Mosaic and leaf-curl are different; in the latter the tissue arches upward in a fashion not found in eastern blue-stem. The variety Hoosier seems to be most susceptible while the Kansas seems to possess the greatest resistance. Other varieties are also susceptible. Suggestions for control are given.—*L. R. Hesler.*

PARASITIC PHANEROGAMS

2665. Grinţsescu, Ioan. **Note sur deux Orobanches parasites des plantes cultivées et sur leur origine en Roumanie.** [**Note on two Orobanches parasitic on crop-plants and their source in Rumania.**] Bul. Soc. Ştinţe Cluj **1**: 136–140. 1921.—This paper deals with 2 Orobanches which cause serious injury especially in Dobrudja, namely *Phelipaea ramosa* C. A. Mey. and *Orobanche cumana* Wallr. The first parasitizes especially the roots of *Cannabis sativa, Nicotiana rustica, Solanum tuberosum,* and *S. Lycopersicum.* In the absence of cultivated plants it grows on many weeds, the most important of which are given. The typical form occurs in Rumania. It originated in the steppes of Asiatic Russia and has spread apparently with the cultivation of *Cannabis* as far as Portugal.—More interesting still is *Orobanche cumana,* which formerly was little known in Rumania. It lives especially on the roots of *Nicotiana rustica, Artemisia austriaca, Xanthium strumarium,* and *Helianthus annuus.* It has spread from its native home in the region of the Caspian Sea over Bessarabia, Dobrudja, and the plateau of Moldavia. Apparently this species is gradually spreading, following the cultivation of *Helianthus annuus.*—*M. Tiesenhausen.*

2666. Long, W. H. **Mistletoe and smelter smoke.** Phytopathology **12**: 535–536. 1922.—In an area of the woodland type which had been exposed to smoke from a copper smelter there were many junipers (*Juniperus monosperma*). Close to the smelter these trees were dead, while further away they showed varying degrees of injury. Some 50 of the living junipers were infected by mistletoe (*Phorodendron juniperinum*) all of which had evidently been dead for more than a year. The author is making a more intensive study in the hope that some practical method for control of mistletoe may be worked out.—The smoke was said to contain compounds of sulphur and arsenic.—*Lillian C. Cash.*

2667. McWhorter, Frank P. **Concerning the sugar cane root parasite, Aeginetia indica.** Philippine Agric. **11**: 89–90. *1 pl.* 1922.—S. Kusano's work [Further studies on *Aeginetia indica.* Bull. Coll. Agric. Tokyo Imperial Univ. **8**: 59–79. 1908] on this parasite is reviewed, and control measures are suggested, based on earlier work and on the author's observations in the Philippines. *Aeginetia indica* L. is found on many wild, and on a number of cultivated, grasses including maize (*Zea Mays* L.), rice (*Oryza sativa* L.), and sugar cane (*Saccharum officinarum* L.).—*Sam F. Trelease.*

NON-PARASITIC DISEASES

2668. Bennett, J. P., and E. T. Bartholomew. **Respiration of potatoes in relation to the occurrence of blackheart in storage.** [Abstract.] Phytopathology **12**: 443. 1922.

2669. Herbert, D. A. **Bitter pit in apples: the crushed cell theory.** Phytopathology **12**: 489–491. 1922.—It is here suggested, and evidence supporting the theory is discussed, that

the dead cells of the pit area are those in which starch transformation has been backward and that they have been crushed by the higher osmotic pressure of the surrounding cells.—*B. B. Higgins.*

2670. Lutman, B. F. **Relation of structure of potato leaves to tip burn.** Potato Mag. 5[1]: 6, 22-23. *6 fig.* 1922.

2671. Reddy, C. S., and W. E. Brentzel. **Investigations of heat canker of flax.** U. S. Dept. Agric. Bull. 1120. *18 p., 5 pl.* 1922.—The heat-canker type of flax injury is of non-parasitic origin and occurs somewhat uniformly each year in the northern Great Plains area, causing marked losses. The cortex of the stem is killed at the surface of the ground and sooner or later the plants topple over. While the young cankered plants die at once, those a little older may remain alive for days or weeks, as long as the vascular systems function. Stems usually enlarge just above the injury and sometimes also just below it, resulting in a girdling of the plants at the soil line. Flax plants canker only during or immediately following very hot days and are only slightly susceptible after they are 4 inches or more high. They are somewhat protected from canker by the use of cereals as nurse crops or even by weeds, and also by shading, or by a shallow surface mulch over a firm seed bed. Killing the cortex of young plants by artificial heat produced typical heat canker. The evidence indicates that a combination of succulence and high temperature of the soil surface favors canker formaton, especially in soil compacted into a crust by rains. Thicker seeding, early sowing, and drilling the rows north and south instead of east and west are suggested as helpful in lessening the severity of canker injury.—*J. T. Buchholz.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

2672. Bezssonoff, N. **La sterilisation partielle du sol et ses applications en phytopathologie.** [The partial sterilization of soils, and its phytopathological applications.] Bull. Soc. Path. Vég. France 9: 169–188. 1922.—This is a review of the various papers by Russell, Henderson, Hutchinson and others. Although good results are acknowledged from the use of chloropicrine treatments of nematode-infested soils the author records the best results from the use of a mixture of calcium sulphide with napthalene to which fertilizing materials (phosphate and potash) are added. From experiments by Rivière and Pichard, Lowett, and Paillot the use of sodium arsenite, and possibly also of calcium arsenite, at the rate of 40 gm. per square m. is suggested. Sodium cyanide also should prove an efficient and cheap disinfectant. In the experiments of Truffaut cymene (paramethyl-isopropyl-benzene) at the rate of 100 gm. per square m. greatly increased the yields of treated soils.—*J. Dufrénoy.*

2673. Castella, F. de. **Bordeaux mixture. Should it be acid or alkaline?** Jour. Dept. Agric. Victoria 18: 749–754. 1920.—The author gives a brief résumé of the history of Bordeaux mixture and its chemical nature followed by a review of recent investigations published by Jean Chauzit in La Revue de Viticulture for May and June. The results show that Bordeaux is effective regardless of its chemical composition, but that alkaline mixtures retain their effectiveness for a longer time, especially in rainy weather.—*Wm. E. Lawrence.*

2674. Davis, W. H. **Staining germinating spores.** Phytopathology 12: 492–494. 1922.—Detailed directions for staining germinating spores of fungi are given.—*B. B. Higgins.*

2675. Dufrénoy, J. **Engrais et poisons des plantes. Desinfection des sols.** [Substances nutrient or toxic to plants. Soil disinfection.] Bull. Soc. Path. Vég. France 9: 223–224. 1922.—Various species of phanerogams are unequally tolerant of metallic ions and react differently to the presence of metallic ores in the ground, or to the addition of disinfectants to the soil.—*J. Dufrénoy.*

2676. Fromme, F. D. **Experiments in spraying and dusting tomatoes.** Virginia Agric. Exp. Sta. Bull. 230. *15 p., 4 fig.* 1922.—Satisfactory control of leaf-blight (*Septoria Lyc-*

persici) was obtained in 7 separate tests in Virginia with soap Bordeaux (4 pounds copper sulphate, 2 of resin fish-oil soap, 3 of quick lime, 50 gallons water). The increase in bushels per acre on plats sprayed with this material ranged from 34 to 125 and the percentage increase from 37 to 107. The number of applications ranged from 2 to 5. Greater yields were obtained with a 3 by 4 spacing of plants than with a 4 by 5 spacing. Soap Bordeaux also gave excellent control of bacterial soft rot (*Bacillus* sp.) the percentage of control based on the check plat being 68 while that of standard Bordeaux was 36. Seven applications of copper-lime dust gave satisfactory control of late-blight (*Phytophthora infestans*) the increase in ripe fruit being 72.7 per cent and the decrease in unsound fruit 69 per cent. The percentage of unsound fruits in the dusted plats ranged from 14 to 27.3 (average 18.3) and that of the check plats from 45.9 to 75.2 (average 55.4). The practicability of spraying or dusting must be determined locally and varies according to market value of the product, cost of material and application, and severity of disease.—*F. D. Fromme.*

2677. K[uyper?], J. **Colloidale Zwavel als middel tegen plantenziekten en witte luis. [Colloidal sulphur as control measure against plant diseases and woolly aphis.]** Arch. Suikerindust. Nederland.- Indië **30:** 671. 1922.—The author discusses a preparation, brought into the trade by the factory "De Haën" in Hanover (Germany), which consists of sulphur that can be made into a colloidal solution with water for spraying. Some experiments were made with Dutch material against white woolly aphis, an extreme attack of which occurred during the harvest of 1921–1922. A solution of 1–2 per cent, gave good results and killed the lice without burning the leaves.—*Peter J. Klaphaak.*

2678. MacMillan, H. G. **Influence of the meterological factors on potato disease and production in Colorado.** [Abstract.] Phytopathology **12:** 445. 1922.

2679. Mangin, L. **La lutte contre les ennemis des végétaux. (1). [Fighting plant pests.]** Bull. Soc. Path. Vég. France **9:** 213–220. 1922.—The importance of biological researches on both host and parasite, in order to know how and when to apply control treatments, is emphasized by reference to the researches of Cazeaux, Cazalet and Capus, and Ravaz on mildew, and to the work of American entomologists on the boll-weevil.—The use of entomophagous insects is advocated from the results obtained by Marchal with *Novius cardinalis*, by Berlese with *Prospatella Berlesi*, and by Howard with *Calosome sycophante*.—The ideal of modern plant pathologists is prophesied to lie in the selection of disease-resistant varieties such as those obtained by Planchon, Millardet, and Ravaz and Viala for mildew-resistant *Vitis;* and by American geneticists for the rust-resistant wheats and Fusarium-resistant plants.—*J. Dufrénoy.*

2680. Meinecke, E. P. **Pathology of quaking aspen in Utah in relation to regulation.** [Abstract.] Phytopathology **12:** 446. 1922.

2681. Melchers, L. E. **Plant diseases heretofore unreported in Kansas.** Trans. Kansas Acad. Sci. **30:** 196–197. 1919/21 [1922].—A list of plant diseases was reported in 1914, including 8 diseases or disease-host relations new to science: *Heterodera radicicola* on Canada thistle, Madagascar periwinkle, marguerite, cockscomb, phlox, and parsley; black chaff and stem disease of wheat (bacterial); *Pleosphaerulina briosiana* Pol. on alfalfa. In 1915, 9 were reported; in 1916 and 1917, 7 were reported, including the following 4 new to science: *Alternaria* on pepper, *Botrytis* on geranium, bacterial disease of lettuce in the greenhouse, and bud blight of sorghum caused by a fungus.—*F. C. Gates.*

2682. Melchers, L. E. **Plant-disease survey report for Kansas, 1918.** Trans. Kansas Acad. Sci. **30:** 197–201. 1919/21 [1922].—This is an annotated list of diseases, including cereal diseases (barley, oats, rye, winter wheat, alfalfa, corn, and sorghum), vegetable diseases (bean, cucumber, beets, cabbage, celery, eggplant, potato, sweet potato), and fruit diseases (apple, blackberry, plum, raspberry, and watermelon). In general, the plant disease situa-

tion was ordinary during 1918 except for the occurrence of the new apple canker disease due to *Leptosphaeria coniothyrium.*—*F. C. Gates.*

2683. Müller, Karl. **Rebschädlinge und ihre neuzeitliche Bekämpfung.** [Grape diseases and the latest methods for their control.] *2nd ed., enlarged, 213 p., 70 fig., 1 map.* G. Braun: Karlsruhe, 1922.—The problems of the vine grower in Germany are treated under the following headings: General considerations relative to grape diseases; the Peronospora disease and its treatment; the application of sprays; the grape mildew; various diseases due to winter injury, soil conditions, and fungi; injury due to *Conchylis ambiguella;* other diseases caused by animals; the grape *Phylloxera,* its spread and control; the cultivation of vines resistant to *Phylloxera;* and the development of new varieties.—*Lillian C. Cash.*

2684. Nixon, E. L. **Profitable potato spraying.** Potato Mag. 4^{10}: 5–6, 13, 19. *5 fig.* 1922.—In 4 years, 1918–1921, 876 demonstrations in 57 counties of Pennsylvania showed an average increase of 56.7 bushels per acre, an increase of 36.7 per cent.—*Donald Folsom.*

2685. Orton, W. A., and F. C. Meier. **Diseases of watermelons.** U. S. Dept. Agric. Farmers Bull. 1277. *31 p., 21 fig.* 1922.

2686. Patouillard, N. **Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XVII. Quelques parasites du cacaoyer à S. Thomé.** [Some parasites of cacao-tree in St. Thomas.] *7 p., 2 fig.* Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—Two important diseases of the cacao-tree, under the vernacular names "gafa" and "mela," occur in St. Thomas. The former attacks the branches, the latter the fruits.—Specimens of the "gafa" disease examined bore an alga, *Cephaleuros virescens* Kunze, and the following fungi: *Nectria albiseda* and its conidial form, *Fusarium Theobromae* App. & Strunk, *Phoma Theobromae,* and *Anthromycopsis filiformis.* The last is probably saprophytic. Diseased fruits affected with "mela" bore *Colletotrichum Theobromae* App. & Strunk, *Stilbum Seabrae,* and *Nectria ochroleuca* Schw. Each fungus is briefly described.—*Frederick V. Rand.*

2687. Pethybridge, G. H., H. A. Lafferty, and J. G. Rhynehart. **Investigations on flax diseases. (Third report.)** Jour. Dept. Agric. Ireland 22: 103–120. *Fig. 1-11.* 1922.—Seedling blight (*Colletotrichum linicolum* Pethybr. & Laff.) was suppressed in 1921 by drought. Browning and stem-break, diseases due to *Polyspora Lini* Laff., were less prevalent than usual. The fungus was disseminated from lower to higher leaves by flax flea-beetles, and was not controlled by spraying with 2 per cent Bordeaux mixture or by seed treatments with copper sulphate, lime, and formaldehyde. The diseases rust and firing are due to *Melampsora Lini.* The teleutospores remain infective after 21 months in a dry place; a biologic race on *Linum catharticum* does not infect cultivated flax. *Thielavia basicola* (B. and Br.) Zopf., proved by inoculations to be the pathogen of root-rot, was also found in the weeds *Senecio vulgaris* and *Chenopodium album.* Flax-droop (no pathogen found) was the result of fiber degeneration in plants of tall-growing pure lines. The pathogen of the Sclerotium disease (*Sclerotinia sclerotiorum* Mass. = *Sclerotinia Libertiana* Fuck.) was cross-inoculated successfully to potato. Alleged frost injury is probably mostly seedling-blight injury. Insect pests are discussed.—*Donald Folsom.*

2688. Ramsay, A. A. **The preparation of colloidal sulphur.** Agric. Gaz. New South Wales 33: 819–823. 1922.—It is practicable to prepare colloidal sulphur on the farm from home-made lime-sulphur mixtures at $\frac{1}{4}$–$\frac{1}{5}$ the cost of proprietary colloidal sulphur preparations. Results of experiments and analyses are given together with methods of preparation and estimates of cost. Each gallon of lime-sulphur mixture was found to yield about 1.25 pounds of colloidal sulphur.—*L. R. Waldron.*

2689. [Schoene, W. J.] **General rules governing the certification of sweet potatoes.** Quart. Bull. Virginia State Crop Pest Commission 4[4]: 4 p. 1923.—The rules apply in Virginia and include methods of bedding for certification.—*F. D. Fromme.*

2690. [Schoene, W. J.] **Progress report cedar rust eradication.** Quart. Bull. Virginia State Crop Pest Commission 4[2]: 4 p. 1922.—Recent progress of cedar eradication as a measure of protection for apple orchards in certain counties in Virginia is discussed. During the period from December 15, 1921, to July 1, 1922, there were 127 petitions filed with the State Entomologist involving an area of 12,721 acres.—Data are also given on crown gall inspection work.—*F. D. Fromme.*

2691. Seabra, Amando de. **Estudos sôbre as doenças e parasitas do cacaueiro e de outras plantas cultivadas em S. Tomé. XVIII. A moléstia nova dos cacaueiros na Ilha de S. Tomé. [The new disease of cacao trees on the Island of St. Thomas.]** *43 p.* Sec. Téc. e Patol. Veg. Companhia Agricola Ultramarina: Lisbon, 1919.—The disease attacks the pods of cacao trees and is caused by *Heliothrips rubrocinctus* Giard., and *Lasiodiplodia Theobromae*.—The insect multiplies rapidly during the dry season and causes first a rusting and change of color of the capsules which resembles the scab of Brazil and Trinidad. This is followed by leaf injury and slow defoliation. During the following rainy season the fungus enters through neglected wounds or insect injuries and causes a drying and dying of ends of branches of adult trees and entirely kills the young trees under 5 years of age.—Fungous threads come to the surface on all infected parts through pores and cracks in the bark. The interior of the bark of infected areas is covered with a fungous mycelium. *Nectria* also does considerable damage and other fungous fructifications accompany those of *Lasiodiplodia*. A number of synonyms for the fungus *Lasiodiplodia Theobromae* are given.—Tobacco solution kills all insects with which it comes in contact but does not give protection against surviving insects or new colonies. Bordeaux controls the fungus. The author recommends Russel's formula for tobacco infusion and a combined treatment with tobacco and Bordeaux. The growing of tobacco as a trap crop is recommended. Infected capsules, branches, and trees should be burned.—The author considers this the most serious disease attacking cacao trees. In 1919 the total loss on St. Thomas was about 10 per cent of the annual crop.—*Charlotte Elliott.*

2692. Seabra, Amando de. **Estudos sôbre as doenças e parasitas do cacaueiro e de outras plantas cultivadas em S. Tomé. XIX. A seca dos ramos dos cacaueiros. [The drying of branches of cacao trees.]** *40 p.* Sec. Téc. e Patol. Veg. Companhia Agricola Ultramarina: Lisbon, 1919.—Drying and subsequent defoliation may be due to drought or to strong winds. A. Drying due to plant parasites. "Gafa" or drying of the ends of branches is an annual disease becoming serious only during periods of great humidity or high temperature. It attacks trees of all ages especially those overcrowded. The initial infection is due to *Lasiodiplodia Theobromae*, which can attack uninjured branches. *Nectria* and *Corticium* are commonly associated with it and also *Macrophoma, Fusarium, Melanoma Henriquesianum*, and an alga, *Cephaleurus virescens*. Disinfection of wounds, pruning and burning of infected branches, and application of Bordeaux control this disease. (2) Sudden death. This is not a nutritional disease but is due to a severe attack of *Lasiodiplodia Theobromae*. The leaves begin to turn yellow in a day, the yellowing becomes more intense and in a few days the whole tree is dry and sapless, the leaves and fruits adhering to the branches for some time. The bark becomes suberized and thickened and through interference with its normal functioning death of the tree results. Plants 4–8 years old and those less resistant to unfavorable climatic conditions are more often attacked. Curative treatments are ineffective. Careful cultural methods greatly lessen infection. (3) Rotting of the base of trunk and roots. *Lasiodiplodia Theobromae* causes the initial infection. *Corticium* and *Nectria* are almost constantly associated with the disease, and Colnariaceae, *Pleonectria*, and higher forms are also found. It attacks plants of all ages, and unlike "Gafa," which disappears with change of climatic conditions, this decay of trunk and roots continually increases until the tree is killed. Lesions first appear as dark areas on the bark from 1–2 feet above the crown down to the exposed

roots. The bark is thickened and as the disease progresses becomes loosened, disclosing a thick layer of white mycelium. Later the bark splits longitudinally and the wood radially, the mycelial layer covering the cracks. The base of the trunk and roots appear much enlarged and saturated with moisture. If treated in the early stages this disease can be entirely overcome. Diseased bark and wood should be cut out and exposed surfaces disinfected with a concentrated solution of sulphate of iron. New soil should be placed around the roots.—The author thinks these 3 diseases are only more or less complicated stages due to the same parasite.—B. Drying due to insects. (1) Cochonilla (*Aspidiotos trilobitiformis* Green or *Pseudaonidia trilobitiformis* Green) attacks the leaves causing yellowing and defoliation. Various insecticides were tried but none proved as effective as the fungus *Microcera cocophila* in destroying the insects. (2) *Neotermes Gestri* enters the branches of old trees through wounds, destroys the subcortical layer, working from upper to lower branches by means of galleries until the whole trunk is destroyed. Darkening of branches, exudate, and accumulations of woody detritus mark the locations of nests, which should be cut off and burned. (3) *Heliothrips rubrocinctus* attacks leaves and capsules. The greatest injury, however, is indirect, the defoliation and weakening of the trees facilitating the entrance of *Lasiodiplodia Theobromae*. (4) Borers of the genus *Zeuzera* attack branches of plants not receiving proper care.—*Charlotte Elliott.*

2693. Seabra, A. F. de. **Estudos sôbre as doenças e parasitas do cacaueiro e de outras plantas cultivadas em S. Tomé. XXIX. Notas sôbre as principais formas de animais e plantas interessando a agricultura de S. Tomé e particularmente a cultura do cacau.) [Notes on the principal animals and plants of interest to the agriculture of St. Thomas.]** *13 p.* Sec. Téc. e Patol. Veg. Companhia Agricola Ultramarina: Lisbon, 1919.—This is a list of fungi, insects, and higher animals and the plants to which they are beneficial or injurious on the Island of St. Thomas.—*Charlotte Elliott.*

2694. Smith, Loren B., and H. H. Zimmerley. **Relation of pressure to effectiveness in spraying tomatoes.** Virginia Truck Exp. Sta. Bull. 33/34. *163–190, fig. 26–34.* 1920.—It is estimated that early-tomato growers in the region of Norfolk, Virginia, lose annually 20–25 per cent of the crop through the tomato fruit worm (*Chloridea obsoleta* Hbn.) and 25–30 per cent additional from leaf mold (caused by *Cladosporium fulvum* Cke.) and leaf spot (caused by *Septoria Lycopersici* Speg.). The following results were obtained by the Bordeaux-lead arsenate spray (4–6–50 + 2 pounds powdered lead arsenate) when applied at the pressure indicated. Seven applications of spray were made in 1919 and 5 in 1920.—The plots sprayed at 200 pounds pressure gave the largest average yield of marketable fruit, exceeding per acre the unsprayed plots by 4,603 pounds in 1919 and 6,202 pounds in 1920. Those sprayed at 140 pounds pressure outyielded the unsprayed plots by 3,323 pounds marketable fruit per acre in 1919 and 5,020 pounds in 1920. On the same basis the plots sprayed at 75 pounds pressure outyielded the unsprayed plots by 2,582 and 3,884 pounds in 1919 and 1920 respectively. In 1919 the plots sprayed at 200, 140, and 75 pounds pressure had respectively 16.25, 16.51, and 16.81 per cent of the fruit injured by fruit worms; the injury on the unsprayed plots was 25.23 per cent. In 1920 the 200, 140, and 75 pound application-pressure plots had respectively 11.70, 14.24, and 15.12 per cent of the fruit injured by worms; the unsprayed controls had 21.39 per cent. In 1919, after deducting the increase in yield due to worm control, the plots sprayed at 200, 140, and 75 pounds pressure gave average increases in yield due to fungus control of 3,025, 2,052, and 1,341 pounds of marketable fruit per acre respectively; in 1920 the corresponding increases were 4,177, 3,608, and 2,695 pounds. Copper soap spray (½ pound copper sulphate, 3 pounds resin fish oil soap, water to make 50 gallons) used during the same years did not give as good results as did Bordeaux.—*H. A. Jones.*

2695. Snapp, O. I., W. F. Turner, and J. W. Roberts. **Controlling the curculio, brown-rot and scab in the peach belt of Georgia.** U. S. Dept. Agric. Dept. Circ. 216. *30 p., 17 fig.* 1922.—This is a discussion of the growth of the peach industry in Georgia since 1890, losses from curculio and brown-rot (*Sclerotinia cinerea* (Bon.) Schr.), relation of curculio injury to

brown-rot, orchard sanitation for curculio control, disking as a control measure, and spraying and dusting. Directions for spraying and dusting and a schedule for each are given.—*L. R. Hesler.*

2696. Soursac, Louis. **Étude de quelques maladies de la laitue et des moyens de les prévenir ou de les combattre.** [**Some diseases of lettuce and their control.**] Bull. Soc. Path. Vég. France 9: 207–213. 1922. [For an almost identical account of the Sclerotinia disease see also Soursac, Louis. Rev. Bot. Appl. et Agric. Coloniale 2: 562–567. 1922.]—*Sclerotinia libertiana* causes much damage in the sandy soils of southern France during moist summers. The different varieties of lettuce are not equally susceptible, the "Romaine" being practically resistant. All drooping lettuce plants should be removed. Crop rotation is also suggested.—Two physiological diseases are very briefly described: "Cabuchage" and stem-fusion.—*J. Dufrénoy.*

2697. Tolaas, A. G. **Minnesota potato certification rules.** Potato Mag. 4^9: 10, 18. 1922.

2698. Tompkins, A. W. **Potato seed certification in South Dakota.** Potato Mag. 4^{12}: 7, 16–17. 1922.

2699. Truesdell, H. W. **Plant pathology in Crimea.** Phytopathology **12**: 533–535. *1 fig.* 1922.—Notes on various diseases of fruit trees, observed by the author in Crimea, are here recorded.—*B. B. Higgins.*

2700. Whetzel, H. H. **Special report by Professor Whetzel.** Agric. Bull. Bermuda Dept. Agric. **1922**: 2–6. June, 1922.—This is a special report to the Bermuda Board of Agriculture on the work done during the year on the diseases and pests of Bermuda crops. It is a brief statement of the chief diseases and pests found, together with suggestions for their control. Two new diseases of lilies are referred to.—*H. H. Whetzel.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Heber W. Youngken, *Editor*

E. N. Gathercoal, *Assistant Editor*

(See also in this issue Entries 2256, 2264, 2265, 2352, 2365, 2374, 2381, 2384, 2390, 2423, 2429, 2433, 2438, 2463, 2479, 2719, 2754, 2762, 2819, 2820)

2701. Anonymous. [Rev. of: Humphrey, J. **Drugs in commerce: their source, preparation for the market, and description.** (Pittman's Common Commodities and Industries.) *x + 116 p., 12 pl.* Sir Isaac Pitman and Sons: London, no date.] Nature **110**: 7. 1922.

2702. Foy, Wm. H. **Tables for the microscopic indentification of inorganic salts.** U. S. Dept. Agric. Bull. 1108. *22 p.* 1922.—The author describes the petrographic methods applied to the indentification of inorganic salts. This method has great advantage in the indentification of salts found in soils, fertilizers, scouring soaps, in dye manufacture, ground glass and sand in foodstuffs, incrustations and efflorescences on buildings, gas pipes, chemical precipitates, etc., and especially in inspection of drugs and similar products. Extensive tables are given showing optical properties of many inorganic salt crystals.—*J. T. Buchholz.*

2703. Houseman, Percy A. **Analysis of licorice root and licorice extract.** Jour. Assoc. Official Agric. Chem. **6**: 191–196. 1922.—Analytical methods are given for licorice root and extracts, with further remarks on various constituents extracted by solvents and not determined quantitatively.—*F. M. Schertz.*

2704. Kinsley, A. T. **Cocklebur poisoning in swine.** Vet. Med. **17**: 282–283. 1922.—A brief description is given of *Xanthium.* The burs injure the wool of sheep, and the poison-

ous young plants cause the death of swine. A short description is given of the symptoms exhibited by poisoned animals and of the lesions produced.—*C. D. Marsh.*

2705. Pammel, L. H. **Blue vervain suspected poisonous to hogs.** Vet. Med. **17**: 385. 1922.—It is stated that blue vervain, *Verbena hastata*, is not eaten by live stock, and is not the cause of poisoning.—*C. D. Marsh.*

2706. Pammel, L. H. **Fool's parsley.** Vet. Med. **17**: 649. 1922.—*Aethusa cynapium*, a European plant, is said to be poisonous to stock in New Mexico. Results of experiments on animals are quoted from Millspaugh.—*C. D. Marsh.*

2707. Pammel, L. H. **Hedge mustard.** Vet. Med. **17**: 385. 1922.—Reply to an inquiry concerning the cause of poisoning of a cow, the author states that he does not consider *Sisymbrium officinale* poisonous.—*C. D. Marsh.*

2708. Pammel, L. H. **Is the bracken fern poisonous?** Vet. Med. **17**: 385. 1922.—Answering a correspondent, the work of Hadwen and Bruce is quoted as establishing the poisonous character of the common brake [*Pteris aquilina*].—*C. D. Marsh.*

2709. Pammel, L. H. **Parsnip or buckeye poisoning.** Vet. Med. **17**: 387. 1922.—Explaining a case of a poisoned cow, wild parsnip, *Pastinaca sativa*, is considered not poisonous. The Ohio buckeye is poisonous under certain conditions, especially when young.—*C. D. Marsh.*

2710. Pammel, L. H. **Sneeze weed.** Vet. Med. **17**: 387. 1922.—Sneeze weed is poisonous to cattle, sheep, and horses, the poisonous principle being principally in the flowers. The young plants are only slightly poisonous. Fatal cases exhibit spasms and convulsions.—*C. D. Marsh.*

2711. Pammel, L. H. **Snow of the mountain.** Vet. Med. **17**: 647. 1922.—Replying to a question concerning *Euphorbia marginata*, it is stated that this plant has an acrid milky juice. The irritating and poisonous effects of several other species of *Euphorbia* are described.—*C. D. Marsh.*

2712. Pammel, L. H. **Supposed poisonous mustards.** Vet. Med. **17**: 387. 1922.—Certain types of mustards cause bloat, but are not otherwise injurious.—*C. D. Marsh.*

2713. Pammel, L. H. **Symptoms of wild cherry poisoning.** Vet. Med. **17**: 190–191. 1922.—Replying to a query in regard to the symptoms of poisoning by a species of *Prunus*, the author quotes Bergman, who is of the opinion that cases of poisoning are not characterized by high fever and are not the result of simple cyanide poisoning. Of 3 species investigated wild black cherry [*Prunus serotina* Ehr.] was most poisonous. Wilted leaves yield the maximum amount of prussic acid.—*C. D. Marsh.*

2714. Pammel, L. H. **Will nightshade poison goslings?** Vet. Med. **17**: 467. 1922.—The several kinds of nightshade, *Solanum*, *Hyoscyamus*, and *Datura* are all poisonous. The author has had no experience with the effect of these on goslings.—*C. D. Marsh.*

2715. Russell, G. A. **The influence of methods of distillation on the commercial value of oil of American wormseed.** Jour. Amer. Pharm. Assoc. **11**: 255–262. *Fig. 1–2.* 1922.—Attention is called to the fact that if the producers of oil of American wormseed would make a change in the apparatus now in use, particularly as to size of pipe from the boiler into the retort so that sufficient steam could be driven through the apparatus to effect the completion of the distillation within 15 minutes, an oil could be secured complying with the requirements of the U. S. P. The author bases his statements upon a series of laboratory and field experiments. He also states the following conclusions: that "warming up" is bad practice; that

water should not be added to the retort but that the retorts should be drained from time to time; that the distillate received should be warm, since cooling the same causes a loss of oil.—*Anton Hogstad, Jr.*

2716. Weits, R., et A. Boulay. **Essai pharmacologique d'un glucoside cardiotonique extrait du Thevetia neriifolia. [Effects of a glucoside from Thevetia neriifolia.]** Compt. Rend. Soc. Biol. **87**: 1105–1106. 1922.—The fruit of *Thevetia neriifolia* (*Cerbera thevetia*), indigenous to Central America but cultivated in Western Africa, yields a glucoside. Injections of 4 mgm. of this drug in dogs weighing 1 kgm. resulted in death within 1 hour through heart paralysis.—*J. Dufrénoy.*

PHYSIOLOGY

B. M. Duggar, *Editor*
W. J. Robbins, *Assistant Editor*

(See also in this issue Entries 2238, 2241, 2249, 2251, 2307, 2310, 2320, 2324, 2374, 2405, 2412, 2444, 2492, 2504, 2507, 2512, 2514, 2529, 2538, 2545, 2552, 2571, 2596, 2613, 2620, 2659, 2677, 2678, 2680, 2681, 2684, 2702, 2792, 2827, 2829, 2831, 2873, 2885)

GENERAL

2717. Anonymous. [Rev. of: Maquenne, L. **Précis de physiologie végétale. (Fundamentals of plant physiology.)** (Collection Payot.) *175 p.* Payot et Cie.: Paris, 1922 (see Bot. Absts. 12, Entry 733).] Nature **110**: 177. 1922.—This is considered a good elementary text.—*O. A. Stevens.*

2718. [B., W. M.] **Biochemistry.** [Rev. of: Moore, Benjamin. **Biochemistry: a study of the origin, reactions and equilibria of living matter.** *vii+340 p., 6 fig.* Edward Arnold & Co.: London, 1921.] Nature **109**: 639–640. 1922.

2719. Marshall, C. E. **Microbiology—A text-book of microorganisms general and applied.** *3rd ed., xxviii + 1043 p., 2 pl., 200 fig.* P. Blakiston's Sons & Co.: Philadelphia, 1921.—In this edition the most noteworthy change has been made by the addition of 3 chapters on the physiology of microorganisms, in which the general principles of physical and biological chemistry and cell mechanism are discussed in relation to these organisms. A better arrangement has been made by regrouping the chapters on food. The discussions on fermented foods and food poisoning have been amplified. Additional material is presented on special industrial fermented products, biological products, and the control of infectious diseases.—*S. R. Warner.*

2720. Moore, Benjamin. **Biochemistry: A study of the origin, reactions and equilibria of living matter.** *vii+340 p., 6 fig.* Edward Arnold & Co.: London, 1921.—This work deals with the physiology, or work, of living matter, rather than with its structure, and it relates both to plant and animal life. The first 2 chapters express observations and thoughts that led to the experimental work described in the next 6 chapters. Chaper I is a consideration of the properties of the energy peculiar only to living matter and of the effects of artificial chemical and physical interference, many specific examples being included. The 2nd chapter reviews the various works on photosynthesis and considers the interrelations of living matter, also the energy of light, the idea being set forth that inorganic colloids activated by radiant energy are to be regarded as a stage in the formation of the organism. The remaining 7 chapters deal with the energy and chemical transformations in living matter and the products of this living matter, with which is combined a critical study of enzymatic activity and equilibria. The chapters giving experimental work are each summarized. The bibliography at the end of the book consists of 17 titles which are references to general monographs and to the author's previous publications. [See also Bot. Absts. 12, Entry 2718.]—*L. J. Klotz.*

2721. Oppenheimer, Carl. **Grundriss der Physiologie. Erster Teil, Biochemie. [Outline of physiology. Part I. Biochemistry.]** *476 p.* Thieme: Leipzig, 1919.—The book is divided into 2 general sections. The 1st is systematic in nature and deals with the various compounds encountered in the animal body in the order of their chemical complexity, giving in handbook fashion their general characteristics and tests, but without sufficient detailed data for use in the laboratory; each natural chemical group is concluded with notes on the physiology of the group. This section also includes notes on the various animal enzymes, taking each one up separately. The 2nd section deals with the chemical physiology of the various compounds, discussing food materials, the transportation of such materials, secretion and excretion, regulations of functions, and the chemistry of tissues. The standpoint is that of the animal physiologist, plant products being mentioned only incidentally. The entire presentation tends to be extremely concise and takes for granted a considerable knowledge of organic chemistry. It constitutes a comprehensive review of the field, but is neither a handbook nor a laboratory guide.—*A. F. Camp.*

2722. Taylor, W. W. **The chemistry of colloids and some technical applications.** *2nd ed., 332 p.* Longmans, Green & Co.: London and New York, 1921.—This edition is practically the same as the 1st. A paragraph on alcogels has been added, and some of the more recent work of Einstein, Svedberg, Oswald, and others is cited.—*H. C. Young.*

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA

2723. Anonymous. **Soaps and proteins.** [Rev. of: Fischer, M. H., G. D. McLaughlin, and M. O. Hooker. **Soaps and proteins: their colloid chemistry in theory and practice.** *ix + 272 p.* J. Wiley and Sons: New York; Chapman and Hall: London, 1921 (see Bot. Absts. 11, Entry 2996).] Nature **110:** 70–71. 1922.—The reviewer regards the work as unsatisfactory, criticising especially 4 alleged defects, as follows: (1) Reasoning by analogy from the properties of soaps as necessarily indicative of the behavior of proteins; (2) ignoring the work of other investigators, especially the contributions on emulsions and froths; (3) ignoring such fundamental factors as surface and interface tensions, adsorption, and film formation; (4) supporting theories by atypical experiments.—*Mildred L. Johnson.*

2724. Joyner, Reginald Arthur. **The viscosity of cellulose. Part II. The lowering of the viscosity of cellulose by various reagents.** Jour. Chem. Soc. [London] **121:** 2395–2409. *4 fig.* 1922.—The viscosity of cellulose is decreased by treatment with NaOH. The temperature coefficient for a rise of 10°C. is about 1.6. KCl is specially notable among salts in increasing the absorption of NaOH by cellulose. This effect may be due to an increase in the OH-ion concentration, to raising the potential of the OH-ion, or it may result from a specific action on cellulose. The action of dilute acids, air, oxygen, hydrogen peroxide, and sodium hypochlorite on cellulose was also studied. Sixteen gm. of oxygen reacted with about 2100–2500 gm. of cellulose. "Raw silver" is not very soluble in cuprammonium solution but becomes so after digestion with dilute NaOH, which destroys the protein matter present, permitting the solvent to attack the cellulose.—*F. E. Denny.*

2725. McBain, James William, and William Job Jenkins. **The ultrafiltration of soap solutions: Sodium oleate and potassium laurate.** Jour. Chem. Soc. [London] **121:** 2325–2344. 1922.—An improved type of ultrafilter, designed for pressures up to 900 pounds per square inch and with a capacity of 250 cc., is described in detail. Its use gave quantitative information on many important problems regarding the condition of soap solutions, e.g., relative amounts of crystalloid and colloid present at any time, osmotic pressure, hydration, diameters of colloidal particles and membrane pores, composition of ionic micellae, etc. Soap, e.g., sodium oleate (NaOl), in true solution behaves as a crystalloid; but with increasing concentration increasing amounts of simple molecules (NaOl) become aggregated into neutral colloid particles $(NaOl)_x$; and increasing amounts of oleate ions (Ol′) are aggregated without loss of electric charge to form colloidal particles known as ionic micellae $(Ol')_n$. It is believed that each ionic micella is formed by the union of at least 8 or 10 ions. By a suitable choice

of membrane and pressure, only crystalloid soap and its simple ions could pass through, the 2 colloidal forms, i.e., neutral colloid and ionic micella, being held back. Even the last 2 were separated by ultrafiltration. The diameters of the pores in any one collodion membrane were found to vary over a wide range. Thus, in 1 membrane 1 pore was 300 $\mu\mu$; 2 were 150 $\mu\mu$; 3, 90 $\mu\mu$; 6, 75 $\mu\mu$; 8, 60 $\mu\mu$.—*F. E. Denny.*

2726. Ruttner, Franz. **Das electrolytische Leitvermögen verdünnter Lösungen unter dem Einflusse submerser Gewächse. I. [Electrolytic conductivity of dilute solutions as influenced by submerged plants.]** Sitzungsber. Akad. Wiss. Wien [Math.-Naturwiss. Kl.] Abt. I. 130: 71–108. *3 fig.* 1921 [1922].—*Elodea canadensis* was grown in distilled and sea water, and in various dilute solutions, such as $CaNO_3$ and $Ca(HCO_3)_2$, and the absorption of ions in light and darkness was followed by the electrical conductivity method. From experimental data giving the resistance in ohms, the conductivity is expressed in reciprocal ohms, and since in dilute solutions such as here employed the ratio of electrical conductivity to equivalent concentration is nearly constant, the ion changes may be expressed in terms of concentrations.—With plants growing in sea water a rhythmic rise and fall of conductivity was observed in the solution. With the advent of daylight the conductivity fell slightly for about an hour, then increased rapidly to a maximum about 3 hours after noon, following which it fell again to a minimum in the early evening; during the night a slow increase again took place. These changes are related to the breaking down of dissolved $Ca(HCO_3)_2$, in which sea water is rich, and the use of CO_2 in assimilation; as a result $CaCO_3$ is precipitated from solution, and the conductivity falls. During intensive assimilation $CaCO_3$ is further broken down by continual removal of HCO_3 ions, which are absorbed by the plant more rapidly than Ca ions. As a result $CaCO_3$ is partly converted into $Ca(OH)_2$. This change is indicated also by the development of marked alkalinity in the solution during daylight, as shown by phenolphthalein. The rise is due to the higher equivalent conductivity of the hydroxide than of the carbonate. There is no diffusion of electrolytes from the plant. The decrease in conductivity in late afternoon is due to the reverse process—change from hydroxide to carbonate; the subsequent increase is due to accumulation of respired CO_2 during the night.—The rise in conductivity may be utilized to determine the effectiveness for photosynthesis of different kinds of light. In red light the changes in conductivity parallel those in white and are nearly as intense; in blue light there was a slight rhythm similar to that in white, while in darkness there was only a steady rise.—By the use of a bicarbonate solution of known $CaCO_3$ content the changes in concentration corresponding to certain conductivity values were determined and from these ratios the amount of CO_2 assimilated per hour and per gm. of dry weight of plant was calculated. In one instance this amounted to 5.2 mgm. CO_2, while 11.9 mgm. of carbonate were precipitated. When natural brook water was used, the corresponding values were 8.0 mgm. CO_2 and 18.1 mgm. $CaCO_3$. This would amount to the deposition of about 2 kgm. of chalk by an Elodea colony, the green weight of which is 100 kgm., each day of 10 hours of sunlight. The importance of this process in building up carbonate deposits is pointed out.—*F. Weiss.*

WATER RELATIONS

2727. Fritsch, F. E. **The moisture relations of terrestrial algae. I. Some general observations and experiments.** Ann. Botany 36: 1–20. *2 fig.* 1922.—The author is concerned with the problem of how subaerial algae are enabled without any special modification to often withstand prolonged periods of drought and to revive with astonishing rapidity when moisture conditions prevail. The amount of water absorbed by the algae *Pleurococcus Naegelii, Hormidium,* and *Zygnema ericetorum,* when moistened, is compared with that taken up by purely aquatic algae, such as *Spirogyra* and *Cladophora,* and also with cotton wool and soil. It was found that *Pleurococcus* absorbs even less water than soil, and that the aquatic algae take up more than the other 2 terrestrial algae studied. If then allowed to become air-dry, *Pleurococcus* reaches the dry state before either *Hormidium* or *Zygnema. Pleurococcus* is extremely sensitive to changes in the moisture content of the air, attributed by Fritsch to the power of its cell-wall to absorb readily any atmospheric moisture. The ter-

restrial algae have no conspicuous vacuoles. If allowed to dry under observation, *Pleurococcus* shows very little contraction, but *Hormidium* and *Zygnema* shrink appreciably. It is noteworthy that in *Hormidium* the cell-wall on drying falls into longitudinal striations observable in the fresh, moist filaments. In contrast with many really aquatic algae, the protoplast in the terrestrial algae examined does not shrink away from the wall when the cells dry in the air, a provision presumably important in the rapid transference of moisture, when in contact therewith, from the cell-wall to the protoplast. The osmotic pressure of the cell-sap of these algae was found to be considerable, and there is a striking correlation between the osmotic pressure and rate of drying; likewise the notable retention of moisture by the air-dry algae is related to the concentration of the sap.—*Nellie A. Carter.*

2728. Knight, R. C. **Further observations on the transpiration stomata, leaf water-content, and wilting of plants.** Ann. Botany 36: 361–385. 1922.—By means of a modified recording potometer it was found that shortly before wilting there occurred a sudden increase in the stomatal aperture, amounting to as much as 40 per cent of its previous magnitude, which increase was accompanied by a simultaneous increase in the rate of transpiration. Wilting occurred when the water content of the leaves had decreased approximately 1 per cent. The water-content of leaves of different ages varied greatly. Diurnal changes of leaf water-content of the plants used in the experiments varied less than 2 per cent.—*Lionel E. Tisdale.*

2729. Yocum, L. E., and A. L. Bakke. **Comparison of absorption occurring in corn stalk tissue and in prepared biocolloids.** Proc. Iowa Acad. Sci. 27: 123–127. *Fig. 25.* 1920.—Masses of tissue cut from vigorous corn stalks and dried were compared with dried agar jelly and agar with 0.05 per cent of egg albumen. Rate and amount of absorption of fluids and increase in thickness and weight were measured. The curves for the 3 substances are very similar, but the values for the corn tissue are all much smaller than those for the other colloids.—*H. S. Conard.*

MINERAL NUTRIENTS (SALT RELATIONS)

2730. Dufrénoy, Jean. **The biological significance of selective adsorption.** Amer. Midland Nat. 6: 159–165. 1920.—Base-adsorbent colloids are found in the cell walls and in most of the granules of the cytoplasm. Nucleoplasm is generally acid-adsorbent except in pathological cases, where it may become base-adsorbent. Competition for bases is constantly going on between the basophilous colloids in the plant and those in the habitat, which may result in a considerable accumulation of bases in the plant tissues with a serious loss in the habitat.—*Sister M. Ellen.*

2731. Gericke, W. F. **"Magnesia injury" of plants grown in nutrient solutions.** Bot. Gaz. 74: 110–113. 1922.—Experiments are here reported which have a bearing on the problem of leaf tip abscission in wheat plants when in nutrient solutions containing a relatively high concentration of certain salts. It was found that the injury sustained by the seedlings when grown in a solution of potassium salts was greatest with K_2SO_4 and least with KH_2PO_4. With calcium salts no injury whatever resulted. Excessive abscission resulted with both $Mg(NO_3)_2$ and $MgSO_4$ but none with $MgHPO_4$. Two conclusions are apparent if the injury in the above cases may be regarded as physiologically the same. (1) The lack of calcium in the nutrient media may induce the injury; this is indicated by the results with K_2SO_4, in which case Mg was not present. (2) The presence of phosphorus tends definitely to prevent the injury, for when the phosphate ion is associated with magnesium or with potassium (and calcium absent) no injury results.—*B. W. Wells.*

2732. Gericke, W. F. **Water culture experimentation.** Science 56: 421–422. 1922.—This paper reports experiments with wheat plants grown in a series of single-salt solutions. The set of plants that grew best was kept for 4 days in KNO_3, 1 day in $CaSO_4$, and 1 day in $MgHPO_4$, then returned to KNO_3, etc. The growth was as good as that of controls in the

complete balanced solution of these 3 salts. The solutions were 0.01 molecular. A trace of an iron salt was added to each solution used.—*C. J. Lyon.*

2733. Herbert, D. A. [Rev. of: Trelease, Sam F., and Burton E. Livingston. **Continuous renewal of nutrient solution for plants in water-culture.** Science **55**: 483–486. 1922 (see Bot. Absts. 11, Entry 4620).] Philippine Agric. **11**: 23. 1922.

2734. Latshaw, W. L. **Report on sulphur and phosphorus in the seeds of plants.** Jour. Assoc. Official Agric. Chem. **6**: 468–470. 1922.—The Parr peroxide bomb was used in determining the sulphur and phosphorus content of several plant materials. Results were very favorable and the method is fully described.—*F. M. Schertz.*

2735. Loeb, Jacques. **Chemical character and physiological action of the potassium ion.** Jour. Gen. Physiol. **3**: 237–245. 1920.—Data obtained from experiments with eggs of *Fundulus* and sea urchins are presented which indicate that the antagonistic behavior of the K ion in salt solutions is due not to any trace of radioactivity, but to the purely chemical character which is determined by position in the periodic system. Li and K ions which are on opposite sides of the Na ion in the periodic table seem to deviate in their physiological action in opposite directions from Na. Tolerance to Li ions in solution with Na and other salts was increased 500 per cent and more by substituting elements on the other side of Na, that is, K, Rb, and Cs, for part of the Na.—*Otis F. Curtis.*

2736. Patchovsky, N. **Über eine Möglichkeit des aussernormalen Entstehens von pflanzlichlem Kalziumoxalat. [Artificial formation of calcium oxalate crystals in plant cells.]** Biol. Centralbl. **39**: 481–489. 1919.—Previous work of the author showed that plants in which no formation of calcium oxalate crystals takes place lack oxalic acid in the cell sap. Investigations here reported seem to prove that in such cases exposure to weak solutions of potassium oxalate of less than fatal toxicity resulted generally in a more or less pronounced formation of calcium oxalate crystals, and that the amount of crystal formation was related to the toxic effect of the oxalate solution on the plant under experiment.—Leaves of *Mnium* and *Funaria*, of *Elodea densa*, *Nasturtium*, and *Ceratophyllum;* moss protonema, *Vaucheria*, and *Spirogyra* were cultivated in close covered glass dishes of 30 cc. capacity. Dilutions of 1, 2, and 3 per cent of potassium oxalate in water were employed and as the experiments were performed in winter the photosynthate deficit was supplemented by a 5 per cent cane sugar solution. Specimens used showed notable differences in resistance to the toxic effect of the oxalate solution. The most resistant—moss protonema—failed to show calcium oxalate crystals. In the more sensitive *Spirogyra*, which normally exhibits crystal formation, exposure to 1 per cent potassium oxalate solution with 10 per cent cane sugar resulted in a notable increase of crystals. It is concluded that this formation of calcium oxalate crystals indicates a means by which plant cells become protected against the toxic effects of oxalic acid, in that the calcium salt of the cell sap combines with the oxalic acid to form an insoluble salt.—*William L. Bray.*

2737. Pfeiffer, Th. **Über den Einfluss des Kalk-Magnesia-Verhältnisses auf das Wachstum der Pflanzen. [Influence of the calcium-magnesium ratio upon the growth of plants.]** Jour. Landw. **69**: 1–3. 1921.—This is in reply to Oskar Loew.—*F. M. Schertz.*

2738. Pfotenhauer, Charlotte, Th. Pfeiffer, und A. Rippel. **Das Verhalten verschiedener Pflanzen schwerlöslicher Phosphaten gegenüber. [The behavior of different plants toward difficultly soluble phosphates.]** Jour. Landw. **69**: 165–183. 1920.—Plants differ physiologically and are characterized by their different powers to act upon difficultly soluble phosphates.—*F. M. Schertz.*

2739. Rippel, August. **Untersuchungen über die Mobilisation der Aschenbestandteile und des Stickstoffs in Zweigen beim frühjahrlichen Austreiben. [Investigation on the mobilisation of the ash constituents and nitrogen in twigs in spring elongation.]** Biochem.

Zeitschr. 113: 125–144. 1921.—Rippel finds that as leaves develop in the spring, P, K, Mg, Na, and N are transported from the twigs to the leaves, while Ca, S, and Cl are not so transported. This corresponds with the transportation from the leaves into the stem in the fall. The elements so transported were found to have occurred almost exclusively in the twigs in organic combinations. When the twigs were placed in nutrient solutions lacking 1 essential element at a time it was found that the element lacking in the nutrient solution was dissolved and transported to a greater extent than when the twigs were placed in distilled water. This was true of all elements transported. The lack of carbohydrates was not reached as soon as the lack of mineral salts. Due to the inability of the twigs to transport calcium, the leaves suffered in their development in the same way that seedlings without calcium suffer.—*F. G. Gustafson.*

2740. Turner, Thomas Wyatt. **Studies of the mechanism of the physiological effects of certain mineral salts in altering the ratio of top growth to root growth in seed plants.** Amer. Jour. Bot. 9: 415–445. 1922.—Previous work on the factors determining the ratio between tops and roots of plants is reviewed. Concentration of the nutrient solution has been thought to influence this ratio, but the author suggests that this result may be due instead to deficiency in one or more of the mineral nutrients. He therefore studied the effect of nitrate ions on the relative behavior of tops and roots in certain plants. In 3 nutrient solutions the concentration of nitrate salts was made low, medium, and high, respectively, the solutions being otherwise identical. With barley and corn, the ratio of tops to roots increases significantly as the nitrate concentration of the solution is increased. The actual dry weight of roots is greatest in the low nitrate solution and of tops in the high. In another set of solutions where the amount of nitrate was left as in the previous experiment, but where the total concentration of the solution less nitrate was greatly altered, essentially the same results were secured, thus indicating that nitrate concentration rather than total concentration was the determining factor in the top-root ratio. Hydrogen-ion concentration was also found to be without effect. With flax, unlike barley and corn, there was no change in the ratio as the nitrate concentration was altered. In all experiments the efficiency of the solution used, as judged by total dry weight produced, was not greatly different.—To determine the direct effect of nitrates on root growth, root tips were grown in nutrient solutions with a supply of sugar; it was found that nitrates increased root growth in all cases. The relation of dry weight to green weight was found to be materially different in certain cases, and it is pointed out that neither dry weight nor length of root is a safe measure of growth. The increased ratio of tops to roots which results from increased nitrate concentration may be due to the increased use of carbohydrates by the tops because of the greater growth there which has been stimulated by the nitrogen. This results in a decrease in the supply of carbohydrates for the roots, which may bring about an absolute or at least a relative reduction in root growth.—*E. W. Sinnott.*

PHOTOSYNTHESIS

2741. Cerighelli, Raoul. **Influence de l'anhydride carbonique sur le développement des plantes—emploi de CO_2 comme engrais atmospherique. [Influence of carbon dioxide upon the development of plants—the use of CO_2 as an atmospheric fertilizer.]** Ann. Sci. Agron. Française et Étrangère 38: 68–75. 1921.—The literature on the subject is briefly reviewed, attention being drawn especially to the work of Demoussy, Brown and Escombe, Cummings and Jones, and Riedel. The author draws conclusions as follows: (1) the enrichment of the air with CO_2 considerably increases the development of plants, whether in the greenhouse or open fields; (2) the CO_2 used should be very pure or at least unmixed with toxic gases. The residual gases of furnaces may be used, and it is quite likely that the CO_2 of fermentation industries may be suitable.—More researches are necessary to put the utilization of the gas on a sound practical basis.—*A. B. Beaumont.*

2742. Gail, Floyd W. **Photosynthesis in some of the red and brown algae as related to depth and light.** Publ. Puget Sound Biol. Sta. 3: 177–193. 1922.—A series of experiments is

reported giving the amounts of photosynthesis in a number of red and of brown algae, using the Winkler method for the determination of the oxygen evolved. The results indicate that certain species of red algae, in nature usually deeply submerged, exhibit maximum photosynthesis at 15 m. approximately. Certain species which occur both deeply submerged and near the surface, usually somewhat different in color in the 2 habitats, have their maxima at different depths, the deeper forms at about 15 m., the shallower form at 1–8 m.—Among the brown algae the maximum photosynthesis in *Fucus evanescens* is at 1 m.; in *Costaria costata*, about 8 m., in *Desmarestia ligulata*, about 15 m.—Those algae growing 3 or more m. below the surface show maximum photosynthesis nearer the surface in cloudy weather (or under a roughened surface) than they do in clear weather and under a smooth surface. Algae growing practically at the surface show reduced amounts of photosynthesis when submerged more deeply. There seems to be a rather definite relation between the maximum photosynthesis and the habitat of species experimented upon. The lower limit at which appreciable photosynthesis takes place in both the red and the brown seaweeds in Puget Sound is about 35 m.—*T. C. Frye.*

METABOLISM (GENERAL)

2743. Bodmer, Helen. **Die Reservestoffe bei einigen anemophilen Pollenarten (Vorläufige Mitteilung). [The reserve materials of certain anemophilous types of pollen. (Preliminary contribution.)]** Vierteljahrsschr. Naturforsch. Ges. Zürich **66**: 339–346. 1921.—This paper deals with the starch, fat, and water content of certain monocot and dicot pollen-grains, and the taking up of food materials from the substratum during the growth of the pollen-tube.—*John H. Schaffner.*

2744. Cajori, F. A. **The use of iodine in the determination of glucose, fructose, sucrose and maltose.** Jour. Biol. Chem. **54**: 617–627. 1922.—A method has been devised for the quantitative determination of glucose, fructose, and sucrose, where these sugars occur together and in small quantities. Results suggesting that the method may be extended to include maltose are given. It is pointed out that in applying this method to plant extracts containing other compounds in addition to the sugars the accuracy of the results will depend on the freedom of the solution analyzed from reducing substances other than sugars, or compounds that will react with iodine.—*G. B. Rigg.*

2745. Combes, Raoul. **La formation des pigments anthocyaniques. [The formation of anthocyanic pigments.]** Compt. Rend. Acad. Sci. Paris **174**: 240–242. 1922.—Studies were made with leaves of *Ampelopsis hederacea*. The experiments of Jonesco, who claimed that the appearance of the red pigment was due to an oxidation process, were repeated. The author disagrees with the conclusions of Noack and of Jonesco, and claims that they did not take sufficient account of the fact that these compounds are derivatives of γ-pyrane.—*C. H. Farr.*

2746. Feher, Daniel. **Über die Abscheidung von Harzbalsam auf den jungen Trieben unserer einheimischen Populus-Arten. [The separation of resin in young shoots of our native species of Populus.]** Beih. Bot. Centralbl. I Abt. **39**: 81–103. 1922.—The secretion of resin is a common occurrence in the Populus species investigated. It is found in small quantities in *P. alba*, *P. tremula*, and *P. canescens*, but in larger quantities in *P. pyramidales*, *P. balsamifera*, and *P. canadensis*.—The secretions take place in the glandular teeth of the foliage leaves, the stipules, and the bud scales. The secretion always occurs in the modified prism-shaped epidermal cells. It passes immediately to the outer surface, or it lifts the cuticle and penetrates between it and the cell membrane. The secretion is resin (Harzbalsam) and contains no gum (caoutchouc).—*L. Pace.*

2747. Forster, M. O. **The laboratory of the living organism.** Sci. Monthly **13**: 301–308. 1921.—This is a summary of the address of the president of the Chemical Section of the British Association for the Advancement of Science dealing, among many purely chemical matters,

with certain bacteriological and technological advances, such as: Buchner's zymase and the later discoveries; the chemical work done by yeasts, molds, and bacteria; the mechanism for utilizing nitrogen and carbon; whether chlorophyll is protective and the result of photosynthesis, or the agent of this process; and many applications of such work.—*L. Pace.*

2748. Heyl, Frederick W. **The phytosterols of ragweed pollen.** Jour. Amer. Chem. Soc. **44:** 2283–2286. 1922.—The following phytosterols were found in the unsaponifiable portion of the ragweed pollen: "ambrosterol," $C_{26}H_{31}O$, melting at 147–149°C., a phytosterol with the formula $C_{27}H_{46}O$; also cetyl alcohol, octodecyl alcohol, and traces of hydrocarbon. There is also some evidence of a hydroxyphytosterol.—*J. M. Brannon.*

2749. Haworth, Walter Norman, and Grace Cumming Leitch. **The constitution of the disaccharides. Part VI. The biose of amygdalin.** Jour. Chem. Soc. [London] **121:** 1921–1929. 1922.—The paper concerns the structural formula of amygdalin extracted from bitter almonds, and in particular the nature of the sugar associated with mandelonitrile in the glucoside.—*F. E. Denny.*

2750. Herzfelder, Helene. **Beiträge zur Frage der Moosfärbungen.** [Moss pigments.] Beih. Bot. Centralbl. I Abt. **38:** 355–400. 1921.—The colors in mosses, like those of higher plants, are due to chromatophores and cell sap; but the most important moss coloring is due to material in the cell wall. This latter material falls into 2 groups, one giving the anthocyan reaction, the other the phlobaphene. This wall-coloring material cannot be stored food, for it could not be used. The disappearance of the color was not observed except in *Orthothecium* where there is a possibility of its further use. The blue color of *Metzgeria fruticulosa* and *M. boliviana* is post mortem.—*L. Pace.*

2751. Hickman, Kenneth, Claude Devereux and Reginald Patrick Linstead. **A modified methyl-orange indicator.** Jour. Chem. Soc. [London] **121:** 2502–2506. *1 fig.* 1922.—In titrating with methyl-orange the end-point is not sharp, but by adding "a suitable screening dye there is a period during the acidification when the amounts of red, green, and blue transmitted are visually equal, so that the solution appears white or neutral grey. The colour change is, therefore, green-neutral grey-magenta, that is, from one colour, through white, to a supplementary colour,—a change to which the eye is most sensitive." The mixed indicator recommended consists of 1 part of methyl-orange to 1.4 parts of xylene cyanole FF dissolved in 500 parts of 50 per cent alcohol. The end-point is at $p_H = 3.8$. The indicator is valuable, for example, in the estimation of mixed hydroxide and carbonate by the double end-point method. Results equal to those obtained in daylight were obtained with a 100-watt, gas-filled, "daylight" lamp with a blue glass bulb.—*F. E. Denny.*

2752. Holbøll, Svend Aage. **Untersuchungen über I. Bangs Mikromethode zur Bestimmung von Traubenzucker.** [Investigation on I. Bang's new micromethod of determining grape sugar.] Biochem. Zeitschr. **113:** 200–209. 1921.—A brief description of Bang's new method for determining glucose is given. This is followed by a verification of the method through experiments in which various amounts of sugar were used. The writer finds that there is a constant relation between the amount of potassium iodate reduced and the amount of glucose, irrespective of the concentration of the glucose. This constant was found to be 0.265 cc. of 0.01 N KIO_3 per 0.1 mgm. of glucose. To calculate the amount of glucose in an unknown solution he used the following equation: $x = 2.00 - n - a \div p$, where n is the number of cc. of 0.01 N KIO_3 reduced, a the number of cc. of 0.01 N thiosulphate used to titrate the remaining KIO_3, and p the constant (0.265). This equation gives the glucose in 0.1 mgm. amounts.—*F. G. Gustafson.*

2753. Irmin, Guido. **Zur Kenntnis der Stoffverteilung bei einigen Iris-Arten, besonders in ihren Blättern.** [The distribution of material in some species of Iris, especially in the leaves.] Beih. Bot. Centralbl. I Abt. **39:** 152–205. 1922.—A brief statement is made as to

papillae, bundles, chlorophyll, parenchyma, spaces, anthocyanin, starch, tannins. This is followed by records of individual investigations on leaf, rhizome, and root of *Iris biglumis*, *I. Gueldenstaedtiana*, *I. songarica*, *I. spuria* var. *sogdiana* and var. *notha*, *I. sibirica*, *I. ruthenica*, *I. japonica*, *I. foetidissima*, *I. versicolor*, *I. Pseudoacorus*.—Seasonal variations are described. All species investigated have tannin either diffused or in idioblasts or in both conditions in the outer and inner epidermis. Its distribution in the mesophyll, the bundles, the rhizomes, and the roots is given. As the leaf continues elongation, from March or April to July or August, the tannin content gradually increases. The idioblasts appear typically first at the base and next at the tip and spread from these 2 areas.—*L. Pace.*

2754. Jacobs, W. A., and M. Heidelberger. **Strophanthin. I. Strophanthidin.** Jour. Biol. Chem. **54:** 253–261. 1922.—Strophanthin is a glucoside which on hydrolysis yields a crystalline substance, strophanthidin, and reducing sugars. Strophanthidin ($C_{23}H_{32}O_6$) is a component of a number of glucosides which possess a characteristic action on the heart and occur in different plants.—*G. B. Rigg.*

2755. Jammieson, George S., Walter F. Bangham, and Dirk H. Brauns. **The chemical composition of peanut oil.** Jour. Amer. Chem. Soc. **43:** 1372–1382. 1921.—Two samples of peanut oil were studied, one a Spanish type grown in South Carolina and the other a Virginia type grown in Virginia. A comparison of these 2 with respect to the percentages of the different fatty acids contained in the glycerides is given below, the figure given first in each case referring to the Spanish type and the other to the Virginia type: oleic acid, 52.9 and 60.6; linolic acid, 24.7 and 21.6; palmitic acid, 8.2 and 6.3; stearic acid, 6.2 and 4.9; arachidic acid, 4.0 and 3.3; and lignoceric acid, 3.1 and 2.6 per cent. Of unsaponifiable matter there was respectively 0.2 and 0.3 per cent.—*J. M. Brannon.*

2756. Kennedy, Cornelia, and L. S. Palmer. **Yeast as a source of vitamine B for the growth of rats.** Jour. Biol. Chem. **54:** 217–232. 1922.—The results do not support the general belief that yeast is an unusually valuable source of the growth-promoting vitamine B, or that it can be accepted as a standard product in experiments in which a vitamine B preparation is required.—*G. B. Rigg.*

2757. Lippman, E. O. von. **Einige pflanzenchemische Beobachtungen.** [**Some observations on the chemistry of plants.**] Ber. Deutsch. Chem. Ges. **54:** 3111–3114. 1921.—The presence of mannose, succinic acid, cane sugar, and "huminstoffe" in certain plants is discussed.—*Henry Schmitz.*

2758. MacDonald, Margaret B. **The synthesis of water-soluble B by yeast grown in solutions of purified nutrients.** Jour. Biol. Chem. **54:** 243–248. 1922.—It would seem from the results obtained by feeding 5 varieties of yeast that, so far as its content of water-soluble B is concerned, yeast grown in solutions of purified nutrients is much like yeast grown in other media. The results obtained with the 5 varieties of yeast tend to make general the conclusions reached by other workers for 1 variety, the conclusion being that yeast is capable of synthesizing water-soluble B when grown in a nutrient solution of the necessary mineral salts (including ammonium chloride) and cane sugar.—*G. B. Rigg.*

2759. Malfitana, G., et Catoire. **L'amylocellulose considérée comme composé d'acide silicique et d'amylose.** [**Amylocellulose considered as a compound of silicic acid and amylose.**] Compt. Rend. Acad. Sci. Paris **174:** 1128–1130. 1922.

2760. Mameli, Eva. **Estudios biologicos sobre el pólen. (Trabajo preliminar.)** [**Preliminary report on the study of pollen.**] Mem. Soc. Cubana Hist. Nat. "Felipe Poey" **4:** 45–77. 1922.—Notes are given on the composition of the pollen in 353 species from 80 families of plants. Of the species studied 63 per cent have oily pollen at maturity and the remaining 37 per cent have pollen classed as starchy.—*J. A. Faris.*

2761. Masters, Helen. **Reactions of cellulose with sodium chloride and other neutral salt solutions. Part I. Preliminary survey.** Jour. Chem. Soc. [London] 121: 2026–2034. 1922.—Results were obtained that were not in accordance with the generally accepted belief that cellulose is without action on dilute solutions of neutral salts. Neutral sodium chloride, when passed through cotton, came out acid, the amount obtainable from 200 cc. of $\frac{N}{10}$ NaCl and 10 gm. of cotton being equivalent to about 4.0 mg. of HCl. When the cotton which had been treated with NaCl was subsequently washed with water the leachings came out alkaline, the amount of alkali obtained in this way being about equivalent to the acid resulting from the original treatment with NaCl. Purified asbestos when treated in the same way did not liberate acid or alkali. Preliminary experiments with wool gave results the reverse of those obtained with cotton. Data on salts other than NaCl are given. Further experiments are planned to give information on the nature of the changes involved in these reactions.—*F. E. Denny.*

2762. Orton, C. R., E. V. McCollum, and N. Simmonds. **Observations on the presence of the antineuritic substance, water-soluble B, in chlorophyll-free plants.** Jour. Biol. Chem. 53: 1–6. 1922.—The onion root [bulb] contains a certain amount of water-soluble B. This fact is believed to warrant the conclusion that water-soluble B is not concerned with the structure of the chloroplast. The mushroom *Agaricus campestris* proved to be a good source of this vitamin. Dodder, *Cuscuta Gronovii*, proved toxic and caused the death of the experimental animals. Indian-pipe, *Monotropa uniflora*, gave inconclusive results.—*G. B. Rigg.*

2763. Palmer, L. S. **Carotinoids and related pigments.** *316 p., 2 pl.* The Chemical Catalog Co., Inc.: New York, 1922.—The distribution and terminology of carotinoids are discussed in a general way. These red, orange, and yellow pigments extractable by fat solvents are found abundantly distributed in the plant world from bacteria to the highest phanerogams, in the animal world from protozoa to man. In a brief chronological review are given the results accomplished by the various workers towards determining the presence of carotinoids in phanerogams. This review is carried out under several subheads, such as carotinoids in roots, in chloroplastids, in etiolated leaves, in flowers, in fruits, in seeds and grains.—The cryptogams are abundantly characterized by these pigments, especially the algae and fungi. The study of carotinoids in bacteria is practically an unexplored field.—Some discussion is devoted to the presence of pigments in vertebrates and invertebrates. The chemical relations between carotinoids in plants and animals are given in detail. The concensus of opinion is that a chemical relation exists between plant and animal pigments, but they are not identical. The biological relation between plant and animal carotinoids is brought out by many experiments and observations contributed or cited by the author. Methods are given for the isolation of carotin from carrots, green leaves, and animal fat; for the isolation of xanthophyll from egg yolk and green leaves; also for lycopin from tomato and fucoxanthin from Phaeophyceae. General properties and methods of identification of carotinoids are explained, such as, crystallization, solubility, and spectroscopic analysis. Likewise, quantitative estimations of the various pigments are given.—The last chapter is devoted to a summation of the various theories concerning the possible functions of the carotinoids in plants and animals.—*Grace E. Howard.*

2764. Tschirch, A. **Besitzt die Pflanze Hormone? [Does the plant have hormones?]** Vierteljahrsschr. Naturforsch. Ges. Zurich 66: 201–211. 1921.—The author compares plant vitamins with animal hormones and believes that vitamins play an important rôle in the plant organism. He also calls attention to such facts as the prolongation of the blooming period in orchids when pollination does not take place. Certain extracts of orchid pollen have the power to shorten the blooming period, as does pollination with living pollen, and seem to be of the nature of hormones. The accumulation and digestion of foods in storage organs, etc., may be due to the action of hormones. Hormones are of first importance as activators of enzymes. A difficulty in the comparison of the reactions in plant and animal bodies lies in the

fact that plants have no blood-vascular system. Passage of the hormones from cell to cell or through the vascular system, especially through the sieve-tubes, is conceivable. It is also possible that the hormone is not transferred but that it arises at the given point through a reaction. Hormones are considered to be chemical substances both organic and inorganic. The reaction might be considered as physical, for example an electrical stimulus; but the author points out that every stimulus must be resolved ultimately into a chemical reaction.—*John H. Schaffner.*

METABOLISM (NITROGEN RELATIONS)

2765. Groenewege, J. **Ueber die Denitrifikation mit ameisensauren Salzen und den Einfluss des Kation auf diesen Prozess.** [Concerning denitrification with formic-acid salts and the influence of the cation on this process.] Dept. Landb. Nijv. en Handel (Nederland.-Indië) Alg. Proefsta. Landb. Mededeel. 7. *22 p.* 1921.

2766. Lipman, C. B. **Does nitrification occur in sea water?** Science 56: 501–503. 1922.—The writer reviews the meager evidence as to the occurrence and activity of nitrifying bacteria in the open sea and near land surfaces. Recent experiments have proved that such bacteria are absent from open sea water though calcareous sand, taken from under open sea water, is found to "harbor vigorous nitrifying organisms."—*C. J. Lyon.*

2767. Lipman, C. B., and J. K. Taylor. **Proof of the power of the wheat plant to fix atmospheric nitrogen.** Science 56: 605–606. 1922.—Analyses of wheat plants grown in water cultures ("Shive's best" solution) prove that there is a gain of nitrogen from the air of at least 13–21 per cent of the total nitrogen found in the plant. Experiments with other plants are in progress and a full account of the work is promised.—*C. J. Lyon.*

2768. May, C. E., and E. R. Rose. **The tryptophane content of some proteins.** Jour. Biol. Chem. 54: 213–216. 1922.—A new colorimetric method for the determination of tryptophane has been devised. The per cent of tryptophane in the plant proteins mentioned was found to be as follows: gliadin 1.05, glutenin 1.80, edestin 1.50, phaseolin 0.80, maize gluten 1.08, legumin 1.05, zein 0.00.—*G. B. Rigg.*

2769. Wettstein, Fritz von. **Das Vorkommen von Chitin und seine Verwertung als systematisch-phylogenetisches Merkmal im Pflanzenreich.** [Occurrence of chitin in plants and its significance as a phylogenetic and systematic character.] Sitzungsber. Akad. Wiss. Wien [Math. -Naturwiss. Kl.] Abt. I. 130: 3–20. 1921 [1922].—Knowledge of the occurrence of chitin as a compound of the cell wall is largely due to van Wisselingh but is highly incomplete, particularly as regards its distribution among the lower thallophytes. The present is a survey of the occurrence of chitin in plants representative of the lowest to the highest orders.—The microchemical detection of chitin depends on its conversion into chitosans by hot lye; the presence of chitosan is indicated by a red violet coloration upon treatment with a solution of I in KI and a dilute acid. Other tests for chitosans, and the chemical reaction of chitin, are described.—The following conclusions on the distribution of chitin are presented: (1) The Myxomycetes (except *Plasmodiophora*) are sharply distinct from other plant groups in the presence of keratin and other protein substances in the cell wall; cellulose also may be present, but chitin is absent. (2) The Cyanophyceae and Schizomycetes, including Chlamydobacteriaceae, possess cell walls in which pectin-like substances predominate, but chitin is absent. (3) Among the euthallophytes there is evident a general differentiation even in the primitive forms into a line with chitinous membranes (the fungi) and one with cellulose (and modified cellulose) membranes (the algae). The Chlorophyceae without exception lack chitin—true even of heterotrophic forms; the cell walls in the Rhodophyceae and Phaeophyceae contain characteristic polysaccharides neither cellulose nor chitin. The Ascomycetes (except yeasts and Laboulbeniales) and the Basidiomycetes possess chitin or chitin-like substances to the complete exclusion of cellulose. Among the Archimycetes and *Phycomyces* there is a sharp differentiation into chitin- and cellulose-possessing forms, the 2 cell wall

constituents being always mutually exclusive. The Synchytriaceae and the Zygomycetes possess chitin, the Oomycetes without exception lack it. The presence or absence of chitin in the cell wall therefore corresponds in a broad way with morphological distinctions.—*F. Weiss.*

METABOLISM (ENZYMES, FERMENTATION)

2770. Baker, Julian Levett, and Henry Francis Everard Hulton. **Amylases of the cereal grains. The "insoluble" amylase of barley.** Jour. Chem. Soc. [London] **121**: 1929–1934. 1922.—Extracting ungerminated cereals with cold water does not remove all of the amylase that is present; but a 2nd yield of amylase firmly attached to some cell constituent can be obtained by various treatments, among them by digestion with papain. This indicated a connection with proteins; and the authors' experiments related to determining with what group of proteins the additional amylase was associated. Barley seed-powder was successively treated with solvents chosen to eliminate different classes of proteins; water removed albumins and soluble amylase, NaCl solution removed edestin, and alcohol removed hordein. Portions of the 3 residues were autodigested with papain and the filtrate tested for amylase. The insoluble amylase was found to be associated with the alcohol-soluble group (hordein); but papain could not liberate amylase from hordein itself, nor from a seed-powder that had been heated to destroy previously existing enzyme. Hence the additional amylase did not arise as a cleavage-product from a protein, but from a "pre-existent insoluble enzyme complex."—*F. E. Denny.*

2771. Fränkel, S., und E. Schwarz. **Über wasserlösliche Vitamine und gärungsbeschleunigende Verbindungen. I. Methodik der Bestimmung und Darstellung der gärungsbeschleunigenden Substanz aus Hefe und Reiskleie.** [Water-soluble vitamins and compounds accelerating fermentation. I. Estimation and preparation of the accelerating substance in yeast and rice polishings.] Biochem. Zeitschr. **112**: 203–235. 1920.—The preparation of the vitamin in yeast is described. It was found that this compound could be estimated qualitatively and quantitatively by its effect on yeast fermentation. This acceleration was measured by the CO_2 evolved in $\frac{1}{4}$ hour, after a preliminary interval of 2 hours, from 5 cc. of 10 per cent yeast suspension, 10 cc. of 10 per cent cane sugar, and yeast vitamin. The acceleration was the excess evolved in comparison with a check, at 28°C.—*H. D Hooker, Jr.*

2772. Groenewege, J. **Ueber das Vorkommen von Emulsin bei Saccharomyceten und das Vorhandensein eines spezifischen Enzyms Zellobiase.** [The presence of emulsin in Saccharomycetes and the existence of a specific enzyme cellobiase.] Dept. Lanbd. Nijv. en Handel (Nederland.- Indië) Alg. Proefsta. Landb. Mededeel. 9. *12 p., 1 pl.* 1921.

2773. Groenewege, J. **Untersuchungen ueber die Zersetzung der Zellulose durch aërobe Bakterien. II. Ueber das Vorkommen von Emulsin in Bakterien, ein Beitrag zur Physiologie der Zellulose-zersetzenden Bakterien.** [The destruction of cellulose by aerobic bacteria. II. The occurrence of emulsin in bacteria, a contribution to the physiology of the cellulose-destroying bacteria.] Dept. Landb. Nijv. en Handel (Nederland.- Indië) Alg. Proefsta. Landb. Mededeel. 8. *19 p.* 1921.

2774. Köhler, E. **Weitere Beiträge zur Physiologie der Hefe.** [Physiology of yeast.] Biochem. Zeitschr. **111**: 17–29. 1920.—The fermentation of 4 per cent maltose by yeast was measured by the number of CO_2 bubbles given off in $\frac{1}{2}$ minute. A 1st maximum rate was reached in 13 minutes, followed by a minimum 4 minutes later, and a 2nd maximum 23 minutes after that. Six hours later fresh maltose solution was added and the curve was repeated: 1st maximum in 3 minutes, minimum 19 minutes later, and 2nd maximum after an interval of 21 minutes. Increase in the rate is thought to be the result of enzyme activation by the sugar; decrease after the 1st maximum, a result of enzyme consumption in excess of activation; and the decrease after the 2nd maximum, a response to the decreasing concentration of sugar.

Fermentation is considered a type of assimilation, and the enzymatic reaction is thought to occur in the outer regions of the yeast plasma.—*H. D. Hooker, Jr.*

2775. Molliard, Marin. **Sur une nouvelle ferementation acide produite par le Sterigmatocystis nigra.** [Concerning a new type of acid fermentation caused by Sterigmatocystis nigra.] Compt. Rend. Acad. Sci. Paris **174**: 881–883. 1922.—It has previously been shown that the Mucedineae under certain conditions can change sugar to citric acid or to oxalic acid. Citric acid is formed if the medium is low in nitrogen, and oxalic acid is produced if it is low in phosphorus salts. There is evidence here presented that a 3rd acid may sometimes be formed. Under certain special conditions there is formed an acid which gives Berg's reactions for acid-alcohols.—*C. H. Farr.*

2776. Neuberg, C., F. F. Nord, und E. Wolff. **Acetaldehyd als Zwischenstufe bei der Vergärung von Zucker durch B. lactis aerogenes.** [Acetaldehyde as an intermediate product in sugar fermentation by Bacillus lactis aerogenes.] Biochem. Zeitschr. **112**: 144–150. 1920.—Acetaldehyde was formed by this organism from glucose in the presence of calcium sulphite and of disodium sulphite, the yield being greater in the latter case.—*H. D. Hooker, Jr.*

2777. Nottin, P. **Solubilisation et dégradation diastasique des matières azotées du maïs; application aux fabriques de levure.** [The solution and diastasic digestion of the nitrogenous substances in corn; the application to the manufacture of yeast.] Compt. Rend. Acad. Sci. Paris **174**: 712–714. 1922.

2778. Richet, Charles., Eudoxie Bachrach, et Henry Cardot. **Études sur la fermentation lactique. Le souvenir chez les microbes.** [Studies on lactic acid fermentation. The memory of microorganisms.] Compt. Rend. Acad. Sci. Paris **174**: 842–845. *Fig. 1–2.* 1922.

2779. Sabatier, Paul. **Catalysis in organic chemistry.** [Translation by E. Emmet Reid.] *406 p.* D. Van Nostrand Co.: New York, 1922.—This is a general work on the subject with abundant references to original sources of information. The work is non-biological, but the elaboration of the mechanism of catalysis and the principles of polymerization, oxidation, hydration, dehydration, decomposition, etc., have application in enzyme systems.—*B. M. Duggar.*

2780. Summer, J. B. **Sur le cytozyme retiré des graines de Canavalia ensiformis.** [Cytozyme extracted from seed of Canavalia ensiformis.] Compt. Rend. Soc. Biol. **87**: 108. 1922.—Seed of this Canavalia furnish a mixture of phosphatids endowed with physiological properties analogous to those of the cytozyme which occurs in the normal coagulation of the blood.—*J. Dufrénoy.*

METABOLISM (RESPIRATION, AERATION)

2781. B., W. E. **Root respiration.** [Rev. of: Clements, F. E. **Aeration and air content: the rôle of oxygen in root activity.** Carnegie Inst. Washington Publ. 315. *183 p.* 1921 (see Bot. Absts. 11, Entry 1950).] Nature **110**: 58–59. 1922.

ORGANISM AS A WHOLE

2782. Brandl, Max. **Über die Brauchbarkeit pflanzlicher Ersatzmittel des Fleischwassers zur Herstellung von Bakteriennährböden.** [The utility of plant substitutes for meat extract in the preparation of bacterial culture media.] Dissertation. *6 p.* Munich (Tierärztl. H.), 1920.

2783. Buchner, Paul. **Tier und Pflanze in intrazellularer Symbiose.** [Animal and plant in intracellular symbiosis.] *464 p., 2 pl., 103 fig.* Gebrüder Borntraeger: Berlin, 1921.—

The volume is essentially a compilation of the data pertaining to the subject, written with the object, as stated by the author in his preface, of showing the need of a fresh consideration and study of the question of the intracellular symbiosis between animals and plants.—The subject matter is arranged under 7 heads, the first 4 grouped according to the natural classification of the invertebrates, dealing with symbiosis in the Protozoa, the sponges, the Coelenterata, the worms, the Bryozoa, the Echinodermata, the Mollusca, the Tunicata, and the Insecta. Besides *Zoochlorella* and *Zooxanthella* the symbionts discussed include various fungi and bacteria. The 5th subhead treats of light-producing symbiosis in the lower animals. The 6th subhead is entitled The Errors in the Investigation of Symbiosis, and in it (as elsewhere incidentally) are discussed the relations of mitochondria. The last subhead embodies the author's concluding remarks.—The volume is abundantly illustrated and contains numerous original figures, particularly in that section dealing with the insects. The index is ample and the bibliography contains approximately 600 titles, principally from zoological contributions.—*Carl Epling.*

2784. Flesch, Hans. **Untersuchungen über optimale Nährböden zur Nachkultur bei der Prüfung von Desinfektionsverfahren.** [Optimal nutrient media.] Dissertation. *6 p.* Munich, 1920.

2785. Groenewege, J. **Over de oorzaak van rustiness op rubber van Hevea brasiliensis.** [On the cause of rustiness on Hevea rubber.] Dept. Landb. Nijv. en Handel (Nederland.-Indië) Alg. Proefsta. Landb. Mededeel. 11. *20 p., 1 pl.* 1921. [With English summary.] —The Saccharomycetes and Oidium which cause the "rusty" coating on sheet rubber obtain their carbon and nitrogen from protein serum constituents, with the exception of the most important organism *Torula heveanensis* n. sp., which can also utilize the quebrachite. The amount of fermentable sugars in the rubber is insignificant. Freshly rolled and sterilized rubber becomes badly rusted in 24 hours. Dissolving out the water-soluble contents under aseptic conditions does not prevent rustiness, but soaking in the presence of bacteria results in the solution and removal of the proteins as well as the quebrachite and sugars, and prevents subsequent rustiness. Rubber once dried undergoes an irreversible loss of permeability; this prevents inward diffusion of proteolytic enzymes and outward diffusion of soluble substances, so that development of the rustiness organisms on the surface can not take place. Certain other characters of rubber are explained on the basis of irreversible permeability change.—*Carl Hartley.*

2786. Pfotenhauer, Charlotte, Th. Pfeiffer, und A. Rippel. **Über den Verlauf der Nährstoffaufnahme und Stofferzeugung bei der Gerste—bezw. Bohnenpflanze.** [The course of food absorption and the increase in dry matter of the barley or bean plant.] Jour. Landw. 69: 137–162. 1920.—The production of dry substances by the plant is increased somewhat by the absorption of minerals and of nitrogen. At the time of ripening no loss of the ash constituents takes place through the roots into the soil. Erroneous conclusions are often drawn because of the dissolving action of atmospheric precipitation. Robertson's formula is not considered correct, for the experimental conditions are never the same. Comparatively low temperatures at the beginning of the growing season cause the first part of the curve to rise too slowly. Barley and mustard show too little growth, while oats, peas, and beans show too much. The difference in growth is probably accounted for by the different dissolving powers of the various roots on the difficultly soluble soil constituents.—*F. M. Schertz.*

2787. Rexhausen, Ludwig. **Über die Bedeutung der ektotrophen Mykorrhiza für die höheren Pflanzen.** [Significance of ectotrophic mycorrhiza for higher plants.] Dissertation. *47 p.* Halle, 1920.

2788. Young, H. C., and C. W. Bennett. **Growth of some parasitic fungi in synthetic culture media.** Amer. Jour. Bot. 9: 459–469. *4 fig.* 1922.—Previous work on the food requirements of fungi is reviewed. The roles of the so-called essential chemical elements as

well as of calcium and zinc were studied in an attempt to produce a synthetic solution for parasitic fungi. Fungi were found to vary markedly in their requirements. Calcium was beneficial to most species, probably from its effect in correcting acidity, and it is evidently to be regarded as an essential element for fungi. Some species were stimulated by zinc, but in others this produced no effect. A proper balance of the inorganic constituents is very essential and can readily be obtained for any given fungus by the use of the 3-salt system.—The following organisms were used: *Fusarium oxysporum, F. batatatis, F. radicicola, Rhizopus nigricans, Aspergillus niger, Botrytis Allii, Phoma apiicola, Fusarium conglutinans, Cercospora Apii, C. beticola, Sclerotinia libertiana* (strain 1), *S. cinerea, S. libertiana* (strain 2), *Rhizoctonia Solani, Macrosporium sarcinaeforme, Sphaeropsis Malorum, Sterigmatocystis Violae, Vermicularia* sp., *Ascochyta Pisi, Colletotricum lagenaria, Dothidella Quercus.*—*E. W. Sinnott.*

GROWTH, DEVELOPMENT, REPRODUCTION

2789. Hopkins, E. F. **The effect of lactic acid on spore production by Colletotrichum lindemuthianum.** Phytopathology **12:** 390–393. *Fig. 1–2.* 1922.—A strain which produced very few spores in neutral potato dextrose agar sporulated freely on this agar after the addition of 3 drops of a 50 per cent solution of lactic acid to each 20 cc. of agar.—*B. B. Higgins.*

2790. Lewis, E. **Yeast growth.** [Rev. of: Slator, A. Trans. Chem. Soc. **1921:** 115–119. 1921.] Jour. Soc. Chem. Indust. **40:** 187R.–188R. 1921.—The reviewer stresses many of the facts set forth in the original as indicated below. The growth of yeast has phases: the quiescent or lag phase, the logarithmic phase of unrestricted growth, and the retarded phase. The amount of growth is dependent on the factors that retard growth. If the ratio of the constant of growth to the fermentative activity is constant, the yeast crop is proportional to the amount of sugar, if this is constant. CO_2 may be a limiting factor. The yield of yeast per unit amount of sugar is dependent on the amount of O_2 supplied. Much sugar is needed when there is little O_2. The important point in aerating is to remove the CO_2, not to supply O_2.—*G. B. Ray.*

2791. Mitscherlich, E. A., und Franz Dühring. **Gefässversuche mit Erlen- und Fichtenpflanzen, 1920. [Pot culture experiments with seedlings of alder and pine.]** Zeitschr. Forst- u. Jagdw. **53:** 486–494. 1921.—In continuation of work described in the abstract following, small trees were grown in pots under controlled conditions to study the effects of different factors. The effect of varying volumes of soil and varying concentrations of nutrient solution upon the growth of yearling pine trees was expressed by the equation

$$y=145\ (1-e^{-2\cdot 4c})\ (1-e^{-0\cdot 18b})\ -8$$

in which c = concentration of nutrient solution and $b = \frac{1}{8}$ the volume of soil; 8 = original weight of the pine seedling. A concentration of 1.5 per cent nutrient solution was somewhat harmful to the trees, otherwise the observed and calculated values agreed very well.—The growth of young alder trees was observed in relation to amounts of water supplied and to the volume of soil in which the seedlings were grown. With constant water content the trees made better growth, corresponding to increased volume of soil. With constant amounts of soil, however, the trees did not grow better with increased amounts of water. The forests trees make better use of the water which stands in the uppermost layers of the soil, because smaller amounts of energy are used for root growth and for water conduction in the plant.—The effect of the applications of Thomas slag upon the growth of oats and pine seedlings was found to be beneficial up to a certain point. The increased growth of the seedlings was a logarithmic function of the amount of Thomas slag applied and was expressed by the equation

$$\text{Log}\ (A-y)\ =\ \log\ (A-6)\ -\ 0.33\ (x-0.9)$$

where A = maximum growth, y = growth attained when x grams of Thomas slag were applied. When the amount of soil for each tree and the amount of Thomas slag were used as variables the growth was expressed by the equation

$$y\ =\ 90(1-e^{-0\cdot 33(x+0\cdot 9)})\ (1-e^{-0\cdot 15x_1})\ -6$$

The laws of growth exemplified in the equations have a general application to plant growth and afford a logical method of studying the effects of various agencies on growth.—*H. S. Reed.*

2792. Mitscherlich, E. A., Franz Dühring, und Susanne von Sancken. **Das Wirkungsgesetz der Wachstumsfaktoren.** [**The law of growth factors.**] Landw. Jahrb. **56**: 71–92. 1921.—Realizing the inconsistencies of Liebig's Law of the Minumum, the senior author has proposed a more comprehensive law of growth factors which assumes that the magnitude of the plant's growth depends not on one, but on all factors influencing growth. The yield increases according to this law of growth with each single growth factor only when this factor is not too near the limiting value. Any growth factor may, within limits, replace another in its power to increase plant yields, without requiring any assumption that one factor may perform the specific function of another in the plant.—If all the conditions were optimal a certain maximum yield, A, would be obtained. If some necessary factor can be deficient there is a corresponding shortage in the yield, but if the amount of the factor be increased the yield is also increased. The rate at which the yield is increased by a small increase of the factor is proportional to its departure from the maximum yield and is expressed by the equation

$$\frac{dy}{dx} = (A-y)\,k \qquad \text{I}$$

A = maximum yield, y = yield obtained when x = amount of factor present, and k = constant. Upon integration I becomes

$$\log (A-y) = C-kx \qquad \text{II}$$

When $x=0$, $y=0$; therefore $\log A=C$, and

$$\log (A-y) = \log A-kx \qquad \text{III}$$

This equation affords no evidence of the existence of a Minimum in Liebig's parlance.—Equation III may be written

$$\frac{A-y}{A} = e^{-kx}, \text{ or}$$

$$y = A(1-e^{-k_2x_2}) \qquad \text{IV}$$

If 2 dependent factors, x_1 and x_2, acting jointly produce a yield of A, the equation will be

$$y=A_1\,(1-e^{-k_1x_1})\,(1-e^{-k_2x_2})$$

or finally for all growth factors,

$$y=A_{\max.}(1-e^{-k_1x_1})\,(1-e^{k_2x_2})\,(1-e^{-k_3x_3})\,(---)\,(---)\,(---)\,(---) \qquad \text{V}$$

This equation is a mathematical expression of the law above stated. This law is applicable to all factors which exert an influence upon the yield of plants. Internal and external factors of growth may be recognized; the former are hereditary, the latter are climatic and edaphic. Man may influence to some extent the factors concerned with water and with nutrients. The authors have shown that the relative value of 2 fertilizer materials containing the same nutrient must be constant. If 2 materials produce the same maximum yield, A, then each contains the same growth factor. If the constant of one material equals k_1 and that of the the other equals k_2, then in order to produce the same yield, y, one must use an amount, x_1, of the first material, and an amount, x_2, of the second material. Therefore,

$$\log (A-y) = \log A-k_1x_1\,;\ \log (A-y) = \log A-k_2x_2.$$

By subtraction, $k_1x_1 = k_2x_2$, or, $\frac{k_1}{k_2}=\frac{x_2}{x_1}$

The amounts of the fertilizer to be applied must therefore be inversely proportional to their effects on growth. The law of growth factors gives an exact valuation of the total fertilizer materials and therewith a physiological basis which may throw light on the possibilities of a plant analysis for determining the fertilizer requirements of soils.—Numerous experiments are reported which show the validity of the law of growth factors.—Various plants were grown under differing light intensities. Their growth curves followed the equations:

oats (grain and straw), $\log (110-y) = 2.0414 - 2.5\ (i\ -0.15)$
peas (grain and straw), $\log\ (\ 42-y) = 1.6232 - 2.5\ (i\ -0.15)$
peas (grain), $\log\ (\ 21-y) = 1.3222 - 2.5\ (i\ -0.177)$

The value of k in each case was 2.5.—The effect of water upon growth was observed in sand and soil cultures. Plants in sand cultures were irrigated with Tollen's solution. Values obtained were:

vetch in sand,	$\log (35-y) = 1.5441 - 0.000515\ w$
oats in sand,	$\log (130-y) = 2.1139 - 0.000515\ w$
vetch in garden soil,	$\log (69-y) = 1.8388 - 0.000515\ w$
carrot in garden soil,	$\log (70-y) = 1.8451 - 0.000515\ w$

The identity of the constant for the different plants in diifferent soils is noteworthy. The author believes that the value of water as a growth factor is independent of the nature of both the plant and the physical character of the soil. By use of equation V, as suggested by Baule [see Bot. Absts. 12, Entry 823], it was shown that the effects of concentration of nutrients and of soil volume are amenable to mathematical treatment:

$$\text{oats, } y = 130.4\ (1-e^{-0.135x})\ (1-e^{-0.24z})$$
$$\text{peas, } y = 340.0\ (1-e^{-0.135x})\ (1-e^{-0.24z})$$

where x = volume of the soil and z = concentration of nutrients. From this and other data the author believes it makes no difference what plant is used for fertilizer experiments. The fact that each fertilizer material possesses a specific physiological nutrient value makes possible an exact evaluation of fertilizer materials. This furnishes a physiological basis for chemical soil analysis, since it is possible to determine quantitatively the effect of various factors on the yield. It is possible, where irregularities occur, to study the physiological reactions and the effect of different sorts of soils on the fertilizer materials and to pursue the problems further by chemical methods. [See also Bot. Absts. 12, Entry 2795.]—*H. S. Reed.*

2793. Prescott, J. A. **The flowering curve of the Egyptian cotton-plant.** Ann. Botany 36: 121–130. *7 fig.* 1922.—The summation flowering curve (total flowers per plant up to a certain mature stage of growth) is worked out for the Egyptian cotton-plant. The methods and equations in obtaining it are given, together with an explanation of its significance in agricultural experiments.—*Marian A. Griffiths.*

2794. Priestly, J. H., and Freda Evershed. **A quantitative study of the growth of roots.** [Abstract.] Rept. British Assoc. Adv. Sci. **1921:** 454. 1921.

2795. Rippel, A. **Die gesetzmässige Erforschung von Reaktionsgleichgewicht (Productionskurve) und Reaktionsgeschwindigkeit (Wachstumskurve) bei den höheren Pflanzen. [The quantitative investigation of the amount and rate of growth of higher plants.]** Jour. Landw. **70:** 9–44. 1922.—This is a résumé of recent work in Germany on the quantitative study of plant growth. Studies are based on the assumption that with a knowledge of all pertinent conditions it is possible to obtain an exact mathematical expression of growth. In dealing with plants it is usually necessary to be content with a practical method for a comparative study of the growth-affecting factors, and later make such refinements as the material may require.—The yield-curve expresses the quantitative result of graded differences in concentration of nutrient substances, other factors remaining constant. The comprehensive law applicable to such phenomena is the law of mass action. The growth-curve deals with reaction-velocities and is essentially a problem in dynamics. The growth reaction behaves as an autocatalytic reaction which is catalyzed by one of the products of the reaction. The value of these views lies in the concept that plant growth in its entirety is an orderly process, capable of quantitative study. This concept has an evident difficulty, namely that the complicated interplay of all possible processes of plant growth should conform to a single physical-chemical law. However, the difficulty does not actually exist because the concept applies, not to the many single physiological processes which operate in the plant, but to their summation.—The production curve is expressed by Mitscherlich [see Bot. Absts. 12, Entry 2792] as follows:

$$\log (A-y) = \log A - kx.$$

The author discusses the relation of this equation to the action of heat, light, and other factors, and he gives a lengthy critique of the fluctuations observed in the value of k, the

so-called "efficiency factor." He holds that Mitscherlich's equation is a full, quantitative expression of Liebig's Law of the Minimum. The equation expresses the quantitative relations between yield and minimum factor. Liebig opposed the idea that when several factors were increased from a minimum to a higher value, without changing their proportionality, a higher plant yield would result. Mitscherlich's investigations afford evidence, however, that this is true. It may also be possible that an increase in the amount of the sole minimum factor might cause a profound mobilization of other substances in the plant.—The curve of growth may be expressed by several equations. The author discusses those proposed by Robertson and by Baule. The external environment has no such influence upon the course of the growth cycle of a species as one might expect on *a priori* grounds. It has been shown that the value of the constants is quite invariable for a given species when grown by various experimenters, in different regions and in different seasons. Different species, however, have very different growth constants.—Since all growth curves eventually become horizontal, it is evident that some limiting factor is operative. The limiting factor may be within the plant or within the environment. The limiting factor is usually operative from the initial stages of growth.—The production curve rests on the law of chemical mass action, although it is impossible to express total yield with all the variable factors involved. If the factors are taken separately, however, it is not difficult to demonstrate their quantitative relations. The assimilation of CO_2 is a case in point.—The growth curves have been shown to resemble those of autocatalysis, as one might expect from the manner of cell-division. The absolute height of the curve is determined by th external factors operative, and the variable factor is time. The flattening of the curve is undoubtedly due to the action of inner, limiting factors, which must be different from those of the production curve. A certain correspondence between the 2 may exist, however, since in the senescent protoplasm absorption and assimilation gradually cease.—*H. S. Reed.*

2796. Robbins, William J. **Cultivation of excised root tips and stem tips under sterile conditions.** Bot. Gaz. 73: 376–390. *Fig. 1–4.* 1922.—Apical meristems of peas, corn, and cotton excised from seedlings were successfully grown under sterile conditions in a modified Pfeffer's solution plus glucose. Glucose proved uniformly superior to levulose. With glucose, however, the growth is of the etiolated type, indicating "that it is not an absence of available carbohydrate which causes the stem elongation and small leaf development of plants grown in the dark." Concerning his experiments with tips excised from culture material the writer states: "When the excised root tips of corn are grown for ten days or two weeks in the dark in a solution containing glucose and mineral salts, and the tip is then cut off and transferred to a fresh solution of the same type, the amount of growth in the 2nd period is less than in the 1st, and ceases in the 3rd period." [See also following entry.]—*B. W. Wells.*

2797. Robbins, William J. **Effect of autolized yeast and peptone on growth of excised corn root tips in the dark.** Bot. Gaz. 74: 59–79. *Fig. 1–8.* 1922.—In sterile Pfeffer's solution plus 2 per cent glucose, in the dark, excised corn root tips grow much less rapidly than those attached to the grain. When the excised root tips are grown under such sterile conditions for about 2 weeks and the tips then severed and transferred to fresh solutions at intervals: "(a) growth stops in the third period; (b) the addition of peptone or autolized yeast permits the root tips to grow for 4–6 periods; (c) a concentration of 200 ppm. [parts per million] of gelatine, 100 ppm. of creatinine, 79 ppm. of glycocoll, 50 ppm. of asparagin, of the corn extract used show no beneficial effect; (d) in Pfeffer's solution lacking nitrates and containing 2 per cent glucose a little less total growth is made than in Pfeffer's solution containing nitrates and 2 per cent glucose; (e) approximately 400 ppm. of peptone is more efficient than 200 ppm; (f) autolized yeast is more beneficial than peptone; (g) the beneficial effect of autolized yeast does not appear in the first period of growth; (h) concentrations of 10, 40, 80, 200, 400 and 800 ppm. of autolized yeast (equivalent in dry matter to about one-third the concentrations given) show no marked difference in their beneficial effect, especially in the early periods; (i) the higher concentrations of yeast evidence a somewhat greater beneficial effect in the later periods than the lower concentrations." Comparisons are also made, as to the extent of

growth, between excised and undisturbed root tips in media with and without autolized yeast. It is further shown that root tips act as individuals and that growth of the primary root tip depresses that of secondary roots. [See also preceding entry.]—*B. W. Wells.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

2798. Birch, John J. **Important movements of plants. II.** Amer. Bot. **28**: 107–112. 1922.—This is a summary of the positions assumed by growing tips of roots and stems.—*S. P. Nichols.*

2799. Birch, John J. **Important movements of plants. III.** Amer. Bot. **28**: 159–167. 1922.—This is a summary of the tropic movements of roots and stems.—*S. P. Nichols.*

2800. Cholodnyj, N. **Zur Theorie des Geotropismus.** [**The theory of geotropism.**] Beih. Bot. Centralbl. I Abt. **39**: 222–230. 1922.—At present no entirely satisfactory theory of geotropism can be formulated, only a working hypothesis may be presented.—The microsomes move easily in the cytoplasm. They usually possess a higher specific gravity than the surrounding cytoplasm. They carry on their outer surfaces a negative electric charge which they give out in their movement towards the anode. In the plasma of positively geotropic cells the microsomes with a specific gravity less than that of the surrounding fluids prevail. As they move upward they produce a corresponding electrical force.—More work is needed on the role of the ion as well as a thoroughgoing cytological investigation of changes due to gravity. Knowledge of the effect of electricity on the geotropic reactions is also needed. Such investigations might show what is necessary to establish or correct this hypothesis.—*L. Pace.*

2801. Jaccard, Paul. **Sur le mecanisme du redressement geotropique de la tige des arbres.** [**The mechanism of geotropic readjustment of the trunks of trees.**] Rev. Gén. Bot. **34**: 385–398, 433–441, 481–488, 529–537. *Fig. 1–4.* 1922.—The author tries to establish the determinism of reactions generally considered as tropisms having some useful significance for the species or the individual.—Supposing that the normal form of growth of woody plants, that of trees in particular, is the result of antagonistic forces in equilibrium oriented parallel either to the direction of gravity or to that of optimum light, all deviations from the normal position of equilibrium provoke a readjustment, either a photo- or geotropic reaction which necessitates mechanical work.—One may investigate whether the mechanical forces brought into play during the readjustment of a trunk, for example, are the result of unequal activity of growth due to geotropic excitation perceived at the tip. It is here assumed that the unequal growth is produced in a way to affect the earlier form of static equilibrium with minimum material. On the contrary, the normal form of equilibrium being disturbed, the tension-compression thus produced may cause the unequal activity of the cambium and the eccentric growth which results. This indicates the trend of the author's argument, a detailed review of which cannot be given.—It is believed that the growth acceleration is essentially determined by the reaction to the mechanical effect, due to gravity and engendered by photo- and geotropic orientation. Further it is pointed out that the "finalists" do not deny the influence of mechanical actions on growth in thickness, but admit it only as a complementary claim, as a factor capable of accentuating, enfeebling, or neutralizing the effects of geotropic stimulation. This mixture of "finalism" and "causalism" recalls strongly the concession made by vitalism to physico-chemical determinism in the domain of physiology.—Conformable to the results of his experiments the author believes that the majority of cases of unequal rapidity of growth in thickness of leaning trunks and branches may be explained by the antagonistic action of tension-compression and by the influence of the acceleration or retardation that these forces exert on the activity of the cambium.—The importance of the forces of orientation in growth cannot be overestimated. Their morphogenic influence is affirmed from the beginning of segmentation: it dominates all the karyokineses, and the analogy which these phenomena present between organic polarity and magnetic or electric polarity is not fortuitous.

The difference in behavior of the 2 poles of growth of vegetation exposed to gravity is not stranger than that which distinguishes the magnetic poles of opposite names. The different properties of twigs and roots is only possible as a consequence of this general and original polarity which they carried in the embryo; in the case of twigs and radicle, Letellier has already established it, by a difference of specific gravity which constitutes without doubt one of the immediate reasons for their final differentiation. It is not without interest to remark that in a general way the radicle, having turned from the side of the micropyle, is found from the point of view of its osmotic nutrition in different condition from that of the plumular pole. Without undervaluing the role of heredity, this memory of repeated reactions which are carried out by a specific structure, one cannot avoid thinking that an equal difference might possibly be the first cause of the character of polarity which became accentuated in the repetition.—As to the morphogenic influences which govern nutrition and growth it is necessary to determine the part which they play, thus: (1) the forces of orientation, gravitation, radiation, and to a lesser extent those of chemical affinity, and electric and magnetic currents; (2) osmotic forces which play a part in nutrition; (3) mechanical forces engendered by growth and resulting from gravity; and (4) catalytic forces in which are included enzymic action and the influence of hormones, these last sometimes considered as agents of transmission governing the correlations of growth.—The author does not deny that a number of phenomena such as concern floral biology, the dissemination of seed or the transport of pollen by the aid of insects adapted to the operation, can only be explained in a satisfactory manner by mechanical or chemical actions; therefore in this study it is held that general characteristics of form, type of symmetry, and the deviations which plants undergo are under the influence of morphogenic factors, the dominant forms of which are gravity and light.—*J. C. Gilman.*

2802. Ricome, H. **Sur l'élongation des racines. [On the elongation of roots.]** Compt. Rend. Acad. Sci. Paris 174: 880–881. 1922.—The fact that the stem of a horizontal plant turns up and the root turns down makes it seem that the reaction of these 2 structures to the same stimulus is exactly opposite. The experiments here reported are, however, interpreted as showing that they both respond in the same way. It is found that if a root is pricked with a needle it curves during the 1st hour throughout a distance of about 15 mm. If the root is in the normal vertical position this curvature will direct the tip of the root horizontally. This curvature is a modification of internal tensions and is not due to gravity. It will later turn down again, causing the root to assume an elbow form. If, however, the root be pricked when in a horizontal position the curvature always occurs upward at first, just as the stem always grows upward when in a horizontal position. It has previously been shown that if the region of cell elongation of a stem be injured, the stem turns downward; now it appears that if the region of cell division of a root is injured, the root curves upward. It is therefore concluded that the region of cell elongation responds to the stimulus of gravity by causing the organ to bend downward, and the region of cell division responds to the same stimulus by causing the organ to curve upward. Thus it appears that the region of cell division governs the direction of the stem, and the region of cell elongation controls the direction of the root.—*C. H. Farr.*

REGENERATION

2803. Weiss, Freeman. **Quantitative relations of regeneration.** [Rev. of: (1) Reed, H. S. **Correlation and growth in the branches of young pear trees.** Jour. Agric. Res. 21: 849–876. Pl. 1. 1921 (see Bot. Absts. 11, Entry, 793); (2) Loeb, Jacques. **The quantitative basis of the polar character or regeneration in Bryophyllum.** Science 54: 521–522. 1921 (see Bot. Absts. 11, Entry 801). Bot. Gaz. 73: 496–497. 1922.—The reviewer thinks that progress toward solving the problem of dominance of the apical part of the shoot "must wait on more adequate information concerning the anatomical relations of the apical and lateral buds and of tissue changes in regeneration." He mentions the following as subjects of further investigation: the comparative efficiency of the apical vascular supply and that of lateral buds; the relative age of terminal and lateral buds; the axial gradient in cases of indeterminate growth and those of limited apical growth; presence of cytoplasmic connections; the effect of callus

deposition in the sieve tubes and lignification changes in the phloem as these are related to a possible gradient in transport efficiency from apex to base.—*B. W. Wells.*

TEMPERATURE RELATIONS

2804. Gain, Edmond. **Température ultra-maxima supportée par les embryons d'Helianthus annuus L.** [**The ultra-maximum temperature endured by embryos of Helianthus annuus.**] Compt. Rend. Acad. Sci. Paris **174**: 1031–1033. 1922.—Seed of sunflower survive a temperature of 85°C., though many lose the power of germination. Gradual drying and heating, alternating with periods of cooling or of constant temperature for many hours, or even days, permits of a considerable raising of this temperature limit. It was found that by heating in successive steps with stops at 80 and 110°C. temperatures as high as 135–150°C. may be reached without destroying the viability of the seed. The highest point reached in these experiments was 155° preceded by 15 minutes at 140°C. As high as 52 per cent of the seed which had been raised to 150°C. germinated. Varieties are found to differ in resistance to heat.—*C. H. Farr.*

RADIANT ENERGY RELATIONS

2805. Luckiesch, M. **Ultraviolet radiation. Its properties, production, measurement and applications.** *270 p., 12 pl.* D. Van Nostrand Co.: New York, 1922.—The title indicates the general scope of this work. One chapter is devoted to some effects upon living organisms and protoplasm, and another discusses photochemical effects.—*B. M. Duggar.*

2806. Stoklasa, J. **Über die Radioaktivität des Kaliums und ihre Bedeutung in der chlorophyllosen und chlorophyllhaltigen Zelle. I.** [**Radioactivity of potassium and its significance in chlorophyll-free and green cells.**] Biochem. Zeitschr. **108**: 109–139. 1920.—The percentage of germination and the rate of growth of all plants investigated was increased by radioactive minerals, stones, earths, and natural waters.—Potassium compounds showed the same stimulation, the activity being attributed to the β-rays of potassium.—*H. D. Hooker, Jr.*

TOXIC AGENTS

2807. Plotho, O. von. **Der Einfluss kolloidaler Metallösungen auf niedere Organismen und seine Ursachen.** [**The influence of metals in colloidal solution on lower organisms.**] Biochem. Zeitschr. **110**: 1–32. 1920.—Bacteria, fungi, algae, protozoa, and some higher plants were treated for 1–4 days at 15–20°C. with hydrosols containing 0.003 per cent silver or gold. Absorption of the metal occurred in none of the silver solutions and in none of the gold solutions to which protective colloids were added. Gold absorption took place from weakly alkaline unprotected solutions in all species of *Aspergillus* and *Penicillium* tried, in *Botrytis vulgare* and in *Paramaecium* sp. It never occurred in *Mucor mucedo, Monilia variabilis, Dematium pullulans, Oidium lactis,* or yeast; nor in any of the bacteria, algae, and higher plants treated; nor in amoebae. Gold storage was accompanied by no harmful effects to the fungi other than a delay in the initiation of fructification and a slight retardation of growth in length of the hyphae. It occurred to a greater extent in living than in dead material. The membrane alone was concerned, but no chemical combination with the gold occurred, the metal remaining in the elemental state. Variations in concentration and temperature had no significant effect on gold storage.—*H. D. Hooker, Jr.*

2808. Plotho, Olga, von. **Der Einfluss kolloidaler Metallösungen auf niedere Organismen und seine Ursachen.** Dissertation. *8 vo, 58 p.* Gottingen, 1920.—[See preceding entry.]

2809. Rideal, S., and E. K. Rideal. **Chemical disinfection and sterilization.** *8 vo, viii + 314 p.* Edward Arnold & Co.: London, 1921.—In the introduction the authors write briefly of the relation of microorganisms to human welfare and of the development of methods of disinfection and antisepsis. The remainder of the book may conveniently be divided into

2 parts. Chapters 2–8 treat such topics as disinfection of air, sterilization and preservation of food, sterilization of water, public disinfection, personal and internal disinfection, non-bacterial parasites, and wood preservation. The 6 chapters of the 2nd part treat of the numerous organic and inorganic substances possessing germicidal properties, giving their origin, uses, structural formulae, pertinent physical and chemical characters, trade names, and relative efficiency as germicides. Numerous citations to current literature are given.—*S. G. Lehman.*

2810. Stoklasa, J. **Influence du sélénium et du radium sur la germination des grains. [The influence of selenium and of radium on the germination of seeds.]** Compt. Rend. Acad. Sci. Paris **174**: 1075–1077. 1922.—The seeds of various cereals as well as of *Vicia faba* and buckwheat were tested. Selenium salts in extreme dilutions are found to have a toxic effect, which later changes to a stimulation of growth. All species exposed to radium emanations germinate better. It is also found that radioactivity neutralizes in a large measure the injurious effect of selenium.—*C. H. Farr.*

MISCELLANEOUS

2811. Caldwell, J. S. **Studies in the clarification of unfermented fruit juices.** U. S. Dept. Agric. Bull. 1025. *30 p.* 1922.—Diatomaceous earth is the most satisfactory aid to the filtration of fruit juices yet employed, producing a product which is clear and transparent when bottled, and retaining the flavor and quality of the fresh juice, at a lower cost than by other methods.—*Ira C. Swanman.*

2812. Denny, F. E. **Formulas for calculating the number of fruits required for an adequate sample for analysis.** Bot. Gaz. **73**: 44–57. 1922.—Formulas were given, for use under different conditions of sampling, to estimate the number of fruits required in a sample in order to give a desired assurance that an accuracy within certain limits may be attained. Approximately 250 fruits of oranges, lemons, and grapefruit were analyzed individually. The data so obtained were applied to the formulas and numerical examples worked out to illustrate their use.—*F. E. Denny.*

2813. Loew, Oscar. **Bemerkungen zu Pfeiffer's Entgegnung in betreff der richtigen Anstellung von Topfversuchen. [Remarks on Pfeiffer's reply concerning the correct installation of pot experiments.]** Jour. Landw. **69**: 163–164. 1920.

2814. McClendon, J. F. **Chart for the conversion of colorimetric readings into hydrogen ion concentration.** Jour. Biol. Chem. **54**: 647–653. 1922.

2815. Palitzsch, Sven. **Manuel pratique de l'analyse de l'eau de mer. III. Déterminations des ions hydrogène par la méthode colorimétrique. [Practical manual for the analysis of sea water. III. Determination of H ions by the colorimetric method.]** Bull. Inst. Oceanogr. Monaco 409. *31 p.* 1922.

2816. Price, T. Slater. **Gelatin.** Nature **110**: 285–288. . 1922.—This is a brief review of the behavior of gelatin under various conditions.—*O. A. Stevens.*

2817. Rideal, Eric Keightley, and William Thomas. **Adsorption and catalysis in fuller's earth.** Jour. Chem. Soc. [London] **121**: 2119–2123. 1922.

2818. Rudnick, R. A., and A. L. Bakke. **The mechanical penetration of the sweet corn pericarp.** Proc. Iowa Acad. Sci. **27**: 129–132. *Fig. 26.* 1920.—By suspending the pans of a scale on a pulley it was possible to measure greater pressures than could be used with a Joly balance. Pericarp of corn in the "canning stage," dented, and mature were used, both dry and after 8–72 hours soaking in water. There is a marked increase in the pressure required to penetrate the pericarp as the grain matures. Soaking does not materially reduce the pressures necessary to cause penetration.—*H. S. Conard.*

2819. Thévenon, L. **Contribution à l'étude de la stérilization des plantes fraîches. Recherches sur la conservation des propriétés antiscorbutiques de l'herbe d'orge.** [The sterilization of fresh plants. The conservation of the antiscorbutic properties of barley.] Thèse Doct. Univ. (Pharm.) Lyon, 1921.

2820. Viehoever Arno. **Microsublimation of plant products.** Jour. Assoc. Official Agric. Chem. 6: 557–559. 1922.—The method used and the results obtained with several plants are reported.—*F. M. Schertz.*

SOIL SCIENCE

A. G. McCall, *Editor*

(See also in this issue Entries 2228, 2231, 2232, 2235, 2238, 2242, 2244, 2245, 2248, 2250, 2255, 2258, 2259, 2267, 2268, 2272, 2273, 2278, 2280, 2347, 2383, 2464, 2469, 2483, 2493, 2737)

2821. Bear, Firman E. **Nitrogen economy in soils.** Jour. Amer. Soc. Agron. 14: 136–152. 1922.—Temperature, rainfall, soil reaction, the cropping system, fertilizer treatment, and soil texture are some of the factors which cause the point of equilibrium between nitrogen income and outgo in soils to vary. The author gives a general discussion of the subject.—*F. M. Schertz.*

2822. Bizzell, James A. **Disappearance of nitrates from soil under timothy.** Jour. Amer. Soc. Agron. 14: 320–326. 1922.—The addition of $NaNO_3$ to timothy sod in early spring is followed by a rapid disappearance of the nitrate from the upper 8 inches of soil; this disappearance is due only in part to the absorption of nitrogen by the growing crop. The nitrate unaccounted for evidently has been utilized by various soil organisms and is therefore transformed into ammonia or some organic combination.—*F. M. Schertz.*

2823. Brown, P. E. **Soil types as a basis for soil investigations.** Jour. Amer. Soc. Agron. 14: 198–206. 1922.—A plea is made for accurate scientific classification of the soils used in experimental work.—*F. M. Schertz.*

2824. Davis, R. O. E. **The interpretation of mechanical analysis of soils as affected by soil colloids.** Jour. Amer. Soc. Agron. 14: 293–298. 1922.—Mechanical analysis does not furnish a true picture of the quantitative distribution of the various sized mineral particles in the soil. The silt and clay groups of mineral particles are made up in part of colloidal material. A water vapor absorption method is described by means of which the colloids present in the silt and clay groups may be determined.—*F. M. Schertz.*

2825. Deighton, Thomas. **Some investigations on the electrical method of soil moisture determination.** Jour. Agric. Sci. 12: 207–230. *Fig. 1–6.* 1922.—After briefly reviewing previous work on the electrical method of soil moisture determination, the author describes further work. "It is concluded that the method gives the mean water content of a volume of soil somewhat greater than a sphere whose poles are the electrodes. Certain resistance–moisture curves obtained in the laboratory are discussed and it is concluded that while at water contents above 10 per cent, the relation found by the American investigators holds good; viz., that the resistance varies inversely as the square of the moisture content; at lower water contents discontinuities appear in the curve. These discontinuities are reversed in the case of artificial mixtures not containing colloids." A tentative explanation of these phenomena is given.—*V. H. Young.*

2826. Demolon, A. **Oxydation microbienne du soufre.** [Sulphur oxidation by bacteria.] Compt. Rend. Congrès Assoc. Française Avancement Sci. 45: 1386–1387. 1921.—Bacteria which oxidize sulphur are found in all soils, but are more abundant in soils rich in humus. The author confirms the parallelism between sulphofication and nitrification.—*J. Dufrénoy.*

2827. Eaton, Scott V. **Sulphur content of soils and its relation to plant nutrition.** Bot. Gaz. 74: 32–58. 1922.—The author used Hart and Peterson's sodium peroxide method in his sulphur determinations. The phosphorus content was also determined, using the magnesium nitrate method recommended by the Association of Official Agricultural Chemists. The author's summary follows in part: The Alabama, Maryland, and Oklahoma soils analyzed are low in sulphur, phosphorus, and organic matter—the phosphorus being not much greater in amount than the sulphur. The soils of the central states are better supplied with these 3 materials and contain decidedly larger amounts of phosphorus than of sulphur. The Chicago soils have a fairly good content of phosphorus, and a rather high content of sulphur and organic matter. The sulphate-sulphur content of the Chicago soils is high, but this accounts for little of the total sulphur, since the greater part is contained in the large amount of organic matter present. Judging from the results obtained and the work of other investigators, sulphur fertilization should prove quite generally beneficial on the Atlantic coast and the Gulf coast, but of doubtful value in the central states. Soils of a high organic-matter content, such as the Chicago soils, may not need sulphur fertilizers except for high sulphur-using crops. No definite conclusions can be drawn from the data as to the relation of sulphur to chlorophyll development, since any effect upon the chlorophyll may come about through the effect of the sulphur in increasing the nitrogen content of the plants. Flowers of sulphur and sodium sulphate, containing the same amount of sulphur as 100 pounds of gypsum per acre, and gypsum at the rate of 500 pounds per acre caused increased dry weights of sweet corn of 35–66 per cent. Larger amounts of flowers of sulphur and sodium sulphate gave no further increases. The corn soil fertilized with sulphur had a higher moisture content than the controls, the excess in the case of the gypsum series amounting to 5 per cent.—*B. W. Wells.*

2828. Emerson, Paul, and John Barton. **The potassium-nitrogen ratio of red clover as influenced by potassic fertilizers.** Jour. Amer. Soc. Agron. 14: 182–192. 1922.—The application of various forms of fertilizers on pot-culture tests of a Miami silt loam soil leads to the following conclusions: The amount of K absorbed by red clover varies with the treatment of the soil. Applications of manure, acid phosphate, or combinations of both increase the solubility of the soil K as indicated by the amount taken up by the plant. K is taken up in larger amounts from kainit than from either KCl or K_2SO_4. Lime as $CaCO_3$ applied to an acid soil apparently has no effect upon the solubility of native soil K, but may possibly overstimulate nitrate production. Applications of lime slightly widen the K-N ratio but manure or acid phosphate or both in the presence of lime narrows the ratio.—*F. M. Schertz.*

2829. Emerson, Paul, and Roland D. Fletcher. **The effect of Sudan grass on the biological processes in the soil.** Jour. Amer. Soc. Agron. 14: 235–241. 1922.—Sudan grass, a heavy feeder, does not materially reduce the crop-producing power of the soil; neither does it influence the soil to respond favorably to the application of common fertilizers. Sudan grass lowers the total bacterial content of the soil on which it grows but apparently does not interfere with the physiological activities of the microorganisms which are concerned in the production of available plant food. Organisms concerned in the transformations of nitrogen in the soil are favorably influenced by the growing of Sudan grass. This effect is particularly noticeable on the crops which follow.—*F. M. Schertz.*

2830. Greaves, J. E. **The influence of irrigation water on the composition of the soil.** Jour. Amer. Soc. Agron. 14: 207–212. 1922.—The intelligent use of irrigation water requires knowledge of the chemical, physical, and biological properties of the soil, together with a knowledge of the composition of the water and its influence upon the chemical, physical, and biological changes going on in the soil.—*F. M. Schertz.*

2831. Hutcheson, T. B., and T. K. Wolfe. **The effect of fertilizers on the germination and bacterial development of inoculated soybean seed.** Jour. Amer. Soc. Agron. 14: 284–286. 1922.—Results indicate that fertilizers at the rate used in these experiments when applied to a sandy loam soil in direct contact with soybean seed had no appreciable detrimental effect on

the germination of the seed or on the development of nodules on the roots of the plants.—*F. M. Schertz.*

2832. K[uyper?], J. **De waarde van stikstof in verschillende kunstmeststoffen. [The value of nitrogen in different fertilizers.]** Arch. Suikerindust. Nederland- Indië 30: 733–734. 1922.—A critical summary is presented of an article in Chemische Industrie (p. 294, 1922) in which a list of prices is given showing the value of nitrogen in several fertilizers as determined by the German Government. It seems that in many places Chili saltpeter is still regarded as better than ammonium sulphate; but in Java, the 2 are regarded as about equal, with a slight prejudice in favor of ammonium sulphate.—*Peter J. Klaphaak.*

2833. Lyon, T. L. **Intertillage of crops and formation of nitrates in soil.** Jour. Amer. Soc. Agron. 14: 97–109. 1922.—Experiments on a silty clay loam soil at Ithaca, New York, covering a period of 2 years, are recorded, and the effects of cultivating, scraping, and mulching are discussed. Evidence presented favors the assumption that the nitrate content of the cultivated plats is higher than that of the scraped plats because of the aeration produced by the stirring.—*F. M. Schertz.*

2834. Robinson, Gilbert Wooding. **A new method for the mechanical analysis of soils and other dispersions.** Jour. Agric. Sci. 12: 306–321. *Fig. 1–4.* 1922.—The author discusses the expression of mechanical composition of soils by curves and suggests that a convenient representation is obtained by showing summation percentage as a function of logarithm of settling velocity. The effect of a gel coating is to reduce the settling velocity of particles, the reduction being a simple function of the thickness of the gel coating. A method of obtaining the mechanical composition of a soil or clay from determinations of the concentration of a settling suspension for different ratios of depth to time is described. A shortened method of mechanical analysis is described which gives results in good agreement with the present standard method, and the effect of various modifications in conditions of working is discussed. An examination is made of the concentration gradients in the settling column of a suspension, and it is shown that below the first few centimeters the change in concentration with depth is very gradual.—*V. H. Young.*

2835. Robinson, Gilbert Wooding. **Note on the mechanical analysis of humus soils.** Jour. Agric. Sci. 12: 287–291. 1922.—Defects of the various methods in vogue for breaking down organic matter in soils preliminary to mechanical analysis are discussed. The use of a neutral substance such as H_2O_2 proved to be satisfactory. Humus soils treated with H_2O_2 gave considerably larger yields of clay and the results appear to more nearly represent the actual constitution of the soil than those obtained from other treatments.—*V. H. Young.*

2836. Salisbury, E. J. **The soils of Blakeney Point: A study of soil reaction and succession in relation to the plant covering.** Ann. Botany 36: 391–432. *Pl. 15, 5 fig.* 1922.—As the dune systems grow older they exhibit a diminution of carbonates and an increase in organic content. These changes are the result of leaching and of augmentation of the plant covering. They are accompanied by a change from an appreciable alkaline condition to a marked acidity, and are correlated with the succession in the vegetation. There is a tendency on the older banks to develop an acid-tolerant type of vegetation. The H-ion concentration varies not only with the degree of leaching but also with the source of the organic material and the phase of its decomposition. The organic material is mainly responsible for the water capacity of dune soils, and in conformity with this the roots of ephemerals tend to occupy the upper layers where the humus is most abundant. The shingle banks show a similar sequence in reaction, organic content, and water content, as is evidenced by a study of shingle laterals of successive age. Floristic lists of these are given. The salt-marsh phases also show indications of increasing organic content, but in these the most important edaphic factor is the duration and frequency of tidal inundation.—*Roy Hansen.*

2837. Tocher, J. F. **The citric solubility of mineral phosphates.** Jour. Agric. Sci. **12**: 125–143. 1922.—Citric solubility is a purely empirical standard for testing mineral phosphates and is of little value in determining their actual value as fertilizers. The author has carried out carefully controlled analytical experiments on citric solubility and decides that it may to a certain degree be a measure of (1) the fineness of grinding, (2) the presence of alkaline substances in fertilizers approximately of the same composition and ground to the same degree of fineness, (3) the presence or absence of fluorides as well as alkaline substances in slags, and (4) the differences in the constitution of the phosphatic compounds in finely ground fertilizers containing approximately the same proportions of extraneous substances. The author concludes that the only practical tests of the value of phosphatic fertilizers from the agricultural standpoint are: (1) total phosphatic content; (2) degree of fineness of grinding; (3) freedom from injurious substances inhibiting plant growth.—*V. H. Young.*

2838. Vinson, A. E., and C. N. Catlin. **Determination of the swelling coefficient of dry soils when wetted.** Jour. Amer. Soc. Agron. **14**: 302–307. 1922.—Different soils show marked differences in the rate of swelling, the rate being seriously modified by chemical treatment. An auxograph with a clock giving 1 revolution of the drum in 15 or 20 minutes is recommended as most suitable for studying the rate of swelling.—*F. M. Schertz.*

2839. Whiting, Albert L., and Warren R. Schoonover. **Nitrate production in field soils in Illinois.** Illinois Agric. Exp. Sta. Bull. 225. *21–63.* 1920.—The influence of soil treatment, cropping systems, and time of year on nitrate production is shown. A comparison of green and stable manure during these tests favors the former. Farm practices which reduce the loss of nitrogen by leaching and also the periods of greatest nitrogen utilization are discussed. The data reported are the result of 4 years' work.—*O. H. Sears.*

2840. Whittles, C. L. **A note on the classification of soils on the basis of mechanical analyses.** Jour. Agric. Sci. **12**: 166–181. *Fig. 1–11.* 1922.—Various methods in vogue for classifying soils on the basis of mechanical analyses are discussed and a graphic method is proposed. A bibliography of 58 titles is appended.—*V. H. Young.*

2841. Zörner, Hans. **Die Bewässerungswirtschaft im Lichte der landwirtschaftlichen Betriebslehre unter besonderer Berücksichtigung der deutschen Verhältnisse. [Irrigation management in the light of agricultural economy, with special reference to German conditions.]** Landw. Jahrb. **57**: 605–665. 1922.—A detailed study of the economy of irrigation is presented under 7 general headings: (1) Natural factors in irrigation; relation between climate and irrigation, soil type and irrigation, type of cultivated plant and irrigation, and distribution of irrigation systems in the world under the influence of natural conditions. (2) Economic factors in irrigation; purpose of irrigation, costs, and rents in irrigation. (3) Suitable amount of irrigation. (4) Relation between artificial fertilizers and irrigation. (5) Organization of irrigation in relation to horticultural and field crops. (6) Influence of irrigation on the other branches of agriculture. (7) Irrigation management in Germany.—*S. A. Waksman.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

E. B. Payson, *Assistant Editor*

(See also in this issue Entries 2239, 2247, 2315, 2385, 2392, 2411, 2436, 2437, 2450, 2506, 2512, 2514, 2558, 2666)

GENERAL

2842. Coutinho, Antonio Xavier Pereira. **Notas da flora de Portugal. [Notes upon Portuguese flora.]** *17 × 25 cm., 15 p.* Allaud e Bertrand: Paris-Lisbon; Francisco Alves:

Rio de Janeiro, 1921.—The author states that this is the 5th and probably the final fascicle of notes supplementary to his Flora de Portugal, and that it is based upon (1) recent collections, and (2) revision of herbarium material made in the light of later monographic work. The list mentions 54 species, exclusively flowering plants, of which 12 species and 10 varieties or forms are additions to the Portuguese flora. There are also revisions of ranges, corrections of determination, etc. In all cases where additions or corrections occur, the author presents revisions of the keys which occur in his Flora de Portugal; especially keys to the cultivated forms of *Triticum*, to *Fumaria*, and to certain portions of *Viola*. *Silene transtagana*, *Dianthus brachyanthus* Bss. var. *nivalis* Wk. f. *Herminii*, *Hedysarum spinosissimum* L. var. *capitatum* (Desf.) f. *glabrescens*, *Lathyrus Cicera* L. β *subbijugus*, *Viola Kitaibeliana* R. & S. β *beirensis*, *Torilis neglecta* var. *triradiata*, *Lavandula pedunculata* Cav. γ *interrupta*, are proposed as new species, varieties, or forms, the authority being P. Cout. in all cases; *Atriplex foliosum* (Lk.) P. Cout. appears to be a new combination as a subspecies.—*E. B. Chamberlain.*

2843. House, Homer D. **A consideration of certain genera proposed by Ehrhart.** Amer. Midland Nat. **6**: 200–207. 1920.—Ehrhart, like Rafinesque, Sweet, and other writers, published genera without descriptions, merely by designating previously published species. In the present paper the author enumerates 18 genera which were proposed by Ehrhart in 1789, designates type species, and then lists some 80 species, mostly of the Cyperaceae, under the Ehrhartian generic names.—*Sister M. Ellen.*

2844. Kops, Jan, F. W. van Eeden, en L. Vuyck. **Flora Batava. Afbeelding en Beschrijving der Nederlandsche Gewassen.** [**Flora of Batavia. Illustrations and descriptions of plants of Holland.**] 410e–413e Aflevering. *Pl. 2033–2048.* Martinus Nijhoff: 's-Gravenhage, 1922.—The vascular plants illustrated in the present parts are *Rubus hirtifolius* Müll. & Wirtg., *R. sulcatus* Vest., *R. Lindleyanus* Lees, *Boltonia asteroides* L'Hérit., *Malva parviflora* L., *Calendula arvensis* L., and *Nicotiana affinis* Moore. The non-vascular plants included are: *Russula Linnaei* Fr., *Cortinarius cinnabarinus* Fr., *C. croceocoeruleus* Pers., *Tricholoma ionides* Bull., *Hygrophorus puniceus* Fr., *H. miniatus* Fr., *Lepiota odorata* Cool., *Mycena pelianthina* Fr. (*M. denticulata* Bolt.), *Polyporus adustus* (Willd.) Fr., *Flammula lenta* Pers., *Stereum sanguinolentum* A.&S., *S. frustulosum* Fr., *Hydnum acre* Quél., and *Trametes Pini* (Brot.) Fr.—*J. M. Greenman.*

2845. Roy, S. C. **A preliminary classification of the wild rices of the Central Provinces and Berar.** Agric. Jour. India **16**: 365–380. 1921.—Many forms of wild rice [*Oryza*] occur in the Central Provinces. The grains fall before the ear is dead ripe and remain dormant in the soil till the next monsoon and so contaminate the rice crop leading to a considerable loss in yield. The method of pollination of wild rice is described and the occurrence of natural cross-fertilization has been proved by the examination of numerous cultures raised from single plants. Twenty-four types of wild rice are described and classified.—*A. Howard.*

2846. Stephens, T. C. **The taxonomic unit.** Proc. Iowa Acad. Sci. **27**: 41–50. 1920.—The citations are chiefly zoological, to be "interpreted as a protest against the substitution of the subspecies for the species as a taxonomic unit."—*H. S. Conard.*

PTERIDOPHYTES

2847. Benedict, R. C. **Have you ever seen Polypodium vulgare as an "air plant?"** [Rev. of: Johnson, Duncan S. **Polypodium vulgare as an epiphyte.** Bot. Gaz. **72**: 237–244. 1921.] Amer. Fern Jour. **12**: 63–64. 1922.—Other instances of common ferns growing as air plants are mentioned.—*F. C. Anderson.*

2848. Benedict, R. C. **Variation in ferns.** Amer. Fern Jour. **12**: 93–96. 1922.—Types of variation in ferns are summarized under 10 heads, and ferns illustrating these types are listed under their respective heads.—*F. C. Anderson.*

2849. Breckenridge, L. P. **Asplenium ebenoides—a station in North Carolina.** Amer. Fern Jour. **12**: 64–65. 1922.

2850. Graves, E. W. **A fern collecting trip in Cuba.** Amer. Fern Jour. **12**: 46–53. 1922.—The author describes his trip, pointing out features of interest connected with the ferns seen. A list of the 51 species collected, distributed among 18 genera, is given. The abundance and locality of each species is noted.—*F. C. Anderson.*

2851. Herter, W. **Itinera Herteriana III. Heteropteridophyta austroamericana. (Equisetales Lycopodiales Selaginellales Isoëtales austroamericanae.)** Beih. Bot. Centralbl. II Abt. **39**: 248–256. 1922.—The distribution of 20 South American species is given. *Isoëtes Weberi* Hert. is described as a new species from Brazil.—*L. Pace.*

2852. Kittredge, E. M. **Osmunda Claytoniana forma Mackiana.** Amer. Fern Jour. **12**: 53–57. *Pl. 3–4.* 1922.—Near Bridgewater Corners, Vermont, Mrs. Mack found a new form which was later named *Osmunda Claytoniana* L. forma *Mackiana* n.f. A description and photographic reproductions of the form are given.—*F. C. Anderson.*

2853. Long, Bayard. **Occurrence of Botrychium matricariaefolium in New Jersey.** Amer. Fern Jour. **12**: 1–9. 1922.—The author points out that the species has a fair distribution and a variety of habitats—ranging from low, wet woods or rocky woods containing limestone to sandy thickets. However, the fern shows a preference for acid soil.—*F. C. Anderson.*

2854. Marshall, M. A. **Lycopodium complanatum var. flabelliforme with twenty-five spikes.** Amer. Fern Jour. **12**: 24. 1922.

2855. Marshall, M. A. **Reminiscences of a fern lover.** Amer. Fern Jour. **12**: 16–19. 1922.

2856. [McCallan, E. A.] **The wild ferns of Bermuda.** Agric. Bull. Bermuda Dept. Agric. 1922: *4 p.* August, 1922.—A list of native ferns of Bermuda is given with names of stations where each occurs.—*H. H. Whetzel.*

2857. McColl, W. R. **Cystopteris bulbifera Bernh.** Amer. Fern Jour. **12**: 22–23. 1922. 1922.—The author describes a locality in which variant forms of *Cystopteris bulbifera* grow. When these forms are transplanted to other places, they return to their original type form.—*F. C. Anderson.*

2858. Munz, Philip A., and Ivan M. Johnston. **The distribution of Southern California pteridophytes.** Amer. Fern Jour. **12**: 69–77. 1922. The authors define what they mean by "Southern California" and divide it into coastal, mountain, and desert areas. Four varieties and 51 species distributed among 7 families are given. Keys to families, genera, and species are also given. Under each species are synonyms, illustration references, location and habitat, and authorities and references for locality records. The article is to be continued.—*F. C. Anderson.*

2859. Upham, Alan W. **A list of ferns found in Woodstock, Conn.** Amer. Fern Jour. **12**: 96–97. 1922.—The list consists of 26 species and 1 variety distributed among 14 genera. *Botrychium simplex* is new for northeastern Connecticut. *Woodsia ilvensis*, not included in the above list, is found a short distance outside Woodstock's border.—*F. C. Anderson.*

2860. Weatherby, C. A. **Is Botrychium dissectum a sterile mutant?** Amer. Fern Jour. **12**: 9–12. *Pl. 1.* 1922.—The specimen photographed was collected in Cass County, Indiana, and shows 3 well-developed fruiting panicles.—*F. C. Anderson.*

2861. Weatherby, C. A. **On a supposed hybrid in Equisetum.** Amer. Fern Jour. 12: 12–16. 1922.—*Equisetum variegatum* var. *Jesupi* A. A. Eaton has been described as a hybrid of *E. variegatum* and *E. hyemale*. When the New England ranges of *E. variegatum* and its variety *Jesupi* were mapped, it was found that the best station for the hybrid contained neither of the supposed parents and that the closest points of approach of these 2 species is 20 miles. Suggestions regarding hybrids are made, but no attempt is made to solve the problem.—*F. C. Anderson.*

SPERMATOPHYTES

2862. Bennett, Arthur. **Calamagrostis stricta and C. strigosa.** Trans. and Proc. Bot. Soc. Edinburgh 27: 305–308. 1919.—The occurrence of these species and their varieties and forms in the British Isles is discussed and further comparison of these with European forms is advised in order to make their adequate definition possible.—*Roxana Stinchfield Ferris.*

2863. Bennett, Arthur. **Potamogeton longifolius Gay in England.** Trans. and Proc. Bot. Soc. Edinburgh 27: 312–314. 1919.—This and related species with which it has been confused are discussed from a systematic standpoint.—*Roxana Stinchfield Ferris.*

2864. Camus, Hickel, et A. [Camus.] **Les chênes d'Indo-Chine. [The oaks of Indo-China.]** Ann. Sci. Nat. Bot. 3: 377–409. *Fig. 1–5.* 1921.—Sixty-nine species are arranged under the 2 genera, *Quercus* L. and *Pasania* Miquel. These are divided into several subgenera. The following new species are described: *Quercus platycalyx, Q. Chevalieri, Q. tranninhensis, Q. lang-bianensis, Q. macrocalyx, Q. Poilanei, Q. Dussaudii, Q. chrysocalyx, Q. austrocochinchinensis, Pasania sabulicola, P. Harmandii, P. cerifera, P. mucronata, P. vestita, P. annamensis, P. pseudosundaica, P. Finetii, P. bacgiangensis, P. tenuinervis, P. auriculata, P. gigantophylla, P. Pierrei, P. kemmaratensis, P. Krempfii, P. elata, P. triquetra, P. megastachya, P. laotica, P. Bonnetii, P. Bonnetii* var. *tienyenensis, P. Capusii, P. Areca, P. Magneinii, P. tubulosa, P. nhatrangensis, P. cerebrina,* and *P. dinhensis.* The following new combinations are included: *Pisania Chittagonga* (*Quercus spicata* var. *Chittagonga* King), *P. Thomsonii* (*Q. Thomsonii* Miq.), *P. farinulenta* (*Q. farinulenta* Hance), *P. elephantum* (*Q. elephantum* Hance), *P. Lindleyana* (*Q. Lindleyana* Wall.), *P. sootepensis* (*Q. sootepensis* Craib), *P. tephrocarpa* (*Q. tephrocarpa* Drake del Castillo), *P. truncata* (*Q. truncata* King), *P. baviensis* (*Q. baviensis* Drake del Castillo), *P. Garrettiana* (*Q. Garrettiana* Craib), *P. Balansae* (*Q. Balansae* Drake del Castillo), *P. hemisphaerica* (*Q. hemisphaerica* Drake del Castillo), *P. cyrtocarpa* (*Q. cyrtocarpa* Drake del Castillo), and *P. calathiformis* (*Q. calathiformis* Skan).—*Paul Weatherwax.*

2865. Denis, Marcel. **Les Euphorbiées des iles australes d'Afrique. [The Euphorbias of the islands of southern Africa.]** Rev. Gén. Bot. 34: 5–64, 96–123, 171–177, 214–236, 287–299, 346–366. *Fig. 1–32.* 1922.—The Euphorbias are represented in the islands of southern Africa by the genera *Anthostema* (1 species) and *Euphorbia* (63 species). The genus *Synadenium* has been introduced into Reunion. Because of an error of determination which the author corrected, it was thought that the genus *Pedilanthus* was present in Madagascar. This genus remains strictly American. The first object of the research was the revision of all the Euphorbias of the islands of southern Africa with a discussion of their specific characters. Some of the characters which were used have not been considered previously as of taxonomic value (presence or absence and form of the cyathophyll, sexuality of the cyathium, form of the fruit, persistence of the calyx in the female flowers). By rendering the idea of species homogeneous and exact, the author was able to suppress or unite with others a dozen species which had been previously established. He was led to consider the genus *Calycopeplus* as an ancient type of *Euphorbia*. Eleven species are described as new: *E. Humbertii, E. Antso, E. obcordata, E. Caput aureum, E. biaculeata, E. pedilanthoides, E. Viguieri, E. mahafalensis, E. mangokyensis, E. xanthadenia, E. brachyphylla,* and *E. hexadenia* (*E. daphnoides* Baill., not Balf. f.). Two new varieties, *E. Perrieri* β *elongata* and *E. emirnensis* β *imbricata,* are described. The author secondly attempted to arrange the species in their natural groups. This is the first trial for

the Madagascar Euphorbias. The chapter on classification was completed with a dichotomous key using characters which were considered most secure and easy of determination. The author considered it impossible to distinguish the Euphorbias of Madagascar by anatomical characters alone. Although anatomy did not furnish the assistance usually expected from it in regard to distinguishing species, it at least confirmed the generic unity, which is otherwise so well defined by the floral constancy. In spite of the multiple aspects and varied adaptations which the Euphorbias of Madagascar present, there is a deep structural constancy. While under the influence of analogous ecological conditions comparable adaptations and morphological convergences between very different systematic elements occur, it is very easy to separate at one stroke species of *Euphorbia*, *Didierea*, or *Asclepias*, because the most profound adaptations do not affect the anatomical characters on which the genus always very definitely rests. In each of the climatic regions of Madagascar is found a certain number of species which seem localized. The central region for example offers a series of forms which are very peculiar from the botanist's point of view and very circumscribed geographically (*E. emirnensis*, *E. orthoclada*, *E. tetraptera*, and *E. ensifolia*). In the 3 regions of the flora of the windward (climate tropically humid) the leafy Euphorbias have persistent leaves; in 2 regions of the flora of the leeward (climate rather dry) the leafy Euphorbias have deciduous leaves. In the south central, the west-south, and throughout the southwest, the xerophytic Euphorbias become fleshy or spiny according to the locality in which they occur. The Euphorbias are remarkable for their adaptations to drought (reserves of water in the pith of the twig or in root tubercles, epidermis protected by reduced transpiration surfaces, embedding of the lenticels, or cutinization of the membrane). As a whole the Madagascar Euphorbias are much more sensitive to the physical influence of the soil than the chemical influence. The sections of *Euphorbia* are separated on the basis of their origin and affinities. They contain some series having a separate evolution. The Madagascar Euphorbias are either strictly endemic, related to the African species (in the great majority of cases), or, exceptionally, related to the Indian species. Concerning the evolution of the Euphorbias in Madagascar, it is possible to make an hypothesis that is in harmony with geologic facts and the epoch of the appearance of the genus *Euphorbia*. During the Nummulitic period, after the reunion of Madagascar with the African continent, the genus *Euphorbia*, which certainly existed at that time, spread to Madagascar by means of the African type *Anthostema*. There it divided into 3 foundation stocks or 3 groups of such stocks which evolved separately: 1 primitive stock of *Anisophyllum*, 1 or more stocks of *Tithymalus*, 1 or more ancestral stocks of *Euphorbia*. The "pro-Euphorbias" have evolved in parallel lines in Madagascar and Africa under the influence of a dry climate. There are produced on each side of the channel of Mozambique a series of comparable xerophytic types, which fact explains the affinities that occur between *Diacanthium* and *Tirucalli* of Madagascar and between the same genera of Africa. The Goniostemas, i.e., the leafy Euphorbias, represent the direct inheritance of a group of "pro-Euphorbia" that evolved under a tropical climate. Man has introduced to Madagascar and the southern islands of Africa some species of wide tropical range. His industry has modified, by utilitarian destruction or by fire, the localization or frequency of some indigenous species.—*J. C. Gilman.*

2866. Farwell, Oliver A. **Panicum lineare, Linn.** Amer. Midland Nat. 6: 49–51. 1919.—The author discusses the description and distribution of *Panicum lineare* as given by Linneaus, who defined it as a new species in 1762. He also gives a number of the more important synonyms for the species.—*Sister M. Ellen.*

2867. Hallier, Hans. **Beiträge zur Kenntnis der Linaceae (DC. 1819) Dumort.** [**Contributions to the knowledge of the Linaceae.**] Beih. Bot. Centralbl. II Abt. 39: 1–178. 1921. —The Cistaceae and related families are discussed. From the genus *Reinwardtia* Dumort. a new genus, **Tirpitzia,** is separated; it is represented by 1 species, namely, *T. sinensis* (*Reinwardtia sinensis* Hemsl.). *Ixonanthes Beccarii* from Sarawak and *I. crassifolia* from Borneo are described as new species. *Ochthocosmus* Benth. and *Phyllocosmus* Klotzsch are united in 1 genus, giving *Ochthocosmus sessiliflorus* Baill. (*Phyllocosmus sessiliflorus* Oliv.), *O. africanus*

Hook. f. (*P. africanus* Klotzsch), *O. Dewewrei* (*P. Dewewrei* Engl.), *O. senensis* (*P. senensis* Engl.), *O. Lemaireanus* de Wild. & Dur. (*P. Lemaireanus* Th. & H. Dur.), *O. candidus* (*P. candidus* Engl. & Gilg), *O. congolensis* de Wild. & Dur. (*P. congolensis* Th. & H. Dur.). The following new species are added: *O. parvifolius* from British Guiana, *O. Barrae* from northern Brazil, and *O. Zenkeri* from Kamerun. *Rhodoclada* Baker is placed in the genus *Asteropeia* Thours, giving *A. rhopaloides* Baill. (*Rhodoclada rhopaloides* Baker). A new species, *Astropeia micraster*, from Madagascar is added. *Rouchera columbiana* is characterized as a new species from Colombia. **Indorouchera** is proposed and described as a new genus and under it the following new combinations, species, and variety occur: *I. Contestiana* (*Rouchera Contestiana* Pierre), *I. Griffithiana* (*R. Griffithiana* Planch.), *I. rhamnifolia* from Sarawak, and *I. Griffithiana* Hallier var. *coriacea* from Borneo. Certain species hitherto referred to *Rouchera* are removed from that genus and their equivalent indicated, as follows. *Rouchera humiriifolia* Planch. = *Hebepetalum humiriifolium* Benth., *R. latifolia* Spruce = *H. latifolium* Benth., *R. macrophylla* Miq. = *Sarcotheca macrophylla* Bl. The following families and some related groups are discussed: Flacourtiaceae, Capparidaceae, Erythroxylaceae, Humiriaceae, Irvingiaceae, Symplocaceae, Salicaceae, Lecythidaceae, Roussaeaceae, Strasburgeriaceae, Pentaphylaceae, Diapensiaceae, Oxalidaceae, and Geraniaceae.—*L. Pace.*

2868. Hofmeyr, Joan, and E. P. Phillips. **The genus Cyclopia, Vent.** Bothalia **1:** 105–109. 1922.—Several species of *Cyclopia* have become of some value locally as the source of "bush tea." The genus has been subdivided into 12 very distinct species mostly confined to the Western Province and the southeastern regions. The following new species, varieties, and combinations are recorded: *Cyclopia Burtonii*, *C. brachypoda* (*C. Vogelii* var. *brachypoda* Harv.), *C. brachypoda* var. *intermedia* (*C. Vogelii* var. *intermedia* Harv., *C. intermedia* E. Mey.), *C. Ashtonii*, *C. Bolusii*, *C. montana*, and *C. montana* var. *glabra.*—*E. P. Phillips.*

2869. Hofmeyr, Joan, and E. P. Phillips. **The genus Olinia.** Bothalia **1:** 97–104. *Pl. 1–3.* 1922.—Sim recognized only 1 species, viz., *O. cymosa* Thunb., but divided this into 3 varieties. The examination of all the South African herbarium material shows that 2 of these varieties belong to *O. cymosa* while the 3rd is a distinct species which Klotzsch described as *O. acuminata.* Another species from Zululand and East Pondoland is described for the first time in the present paper as *O. radiata.*—*E. P. Phillips.*

2870. Jumelle, Henri. **Un grand palmier du centre de Madagascar.** [**A large palm in the central region of Madagascar.**] Compt. Rend. Acad. Sci. Paris **174:** 957–960. 1922.—A description is given of a palm, previously described by the author as *Neodypsis basilongus.* It is now identified as the same plant which Beccari earlier described as *Chrysalidocarpus decipiens.*—*C. H. Farr.*

2871. Kränzlin, Fr. **Beiträge sur Kenntnis der Gattung Telipogon HBK.** [**Contributions to the knowledge of the genus Telipogon HBK.**] Ann. Naturhist. Mus. Wien **33:** 9–38. 1920.—In addition to the new species listed in Bot. Absts. 8, Entry 2251, the following are also published here for the first time: *Telipogon Phalaena* Reichb. f. in sched., Colombia (Hübsch); *T. Schmidtchenii* Reichb. f. in sched., Colombia (Schmidtchen); *T. semipictus* Reichb. f. in sched., Colombia (Karsten), Ecuador (Karsten); *T. Hercules* Reichb. f. Ms., north Peru and Ecuador (Roezl, Lehmann); *T. suffusus* Reichb. f. in sched., Colombia (Lehmann); *T. polyneuros* Reichb. f. in sched. (sphalmate *T. polymerus* Reichb. f. in Linnaea **41:** 4. 1877), Colombia (Roezl, Kalbreyer No. 1923). Notes are added on 2 imperfectly known species, *T. nitens* Reichb. f. and *T. pamplonensis* Reichb. f.—*A. S. Hitchcock.*

2872. Lester-Garland, L. V. **A revision of the genus Baphia, DC. (Leguminosae).** Jour. Linn. Soc. Bot. London **45:** 221–244. 1921.—A revision is presented of the mainly tropical African genus *Baphia.* Fifty-eight species are enumerated, including 3 described as new: *B. myrtifolia*, *B. elegans*, and *B. Nannani* Baker f. *B. elegans* var. *vestita* is also new. Three species are reduced: *B. Mildbraedii* Harms = *B. Wollastoni* Baker f.; *B. ovata* T. R. Sim = *B. Kirkii* Baker; *B. Pynaertii* DeWild. = *B. polygalacea* Baker. Three names are excluded:

B. africana Afz., *B. congolensis* Welw., and *B. lancifolia* Baill. The first of these is a *nomen nudum*, the other 2 are obviously clerical errors for *B. angolensis* and *B. laurifolia* respectively.—*A. J. Eames.*

2873. Manganaro, Ana. **Leguminosas Bonaerenses.** [Legumes of the province of Buenos Aires.] An. Soc. Cien. Argentina **87**: 77–264. *Fig. 1–15.* 1919.—The author presents a study of the endemic Leguminosae of the province of Buenos Aires (Argentina). Five chapters are devoted to a general survey of the family under the following captions: (1) Generalities and affinities; (2) development and morphology, comprising a study of the seedling, root, stem, foliar apparatus, agamic propagation, flowering apparatus, fruit, seeds, secretory apparatus; (3) histology; (4) physiology and ecology, including movements and sensitive organs, symbiosis, pollination, dissemination, edaphic and climatic relations, species diffusion and geographic distribution, origin and constitution of the leguminous flora of Buenos Aires, and statistical studies; (5) paleontological records; (6) taxonomy. Keys are given to the *Mimosoideae*, *Papilionoideae*, and *Caesalpinoideae*, and to the genera included under each subfamily. Pages 123 to 262 are given to the descriptive matter of the genera and species recorded for the province. Two new species are described, namely, *Acacia platensis* and *Astragalus argentinus*. One new combination is made, as follows: *Cercidium praecox* (*Caesalpinia praecox* Ruiz & Pav.). A bibliography is appended.—*A. Bonazzi.*

2874. Phillips, E. P. **The genus Ochna.** Bothalia **1**: 87–96. 1922.—In the Flora Capensis 3 species of *Ochna* are described but investigations show that there are 9 species in South Africa. These are all described and a key to the species precedes the descriptions. The following new species, new combination, and variety are included: *O. Chilversii*, *O. O'Connorii*, *O. natalitia* Engl. & Gilg (*O. atropurpurea* var. *natalitia* Harv., *Diporidium natalitium* Meisn.), and *O. atropurpurea* DC. var. *angustifolia*.—*E. P. Phillips.*

2875. Phillips, E. P. **The thorn pears (Scolopia spp.).** Bothalia **1**: 83–86. 1922.—An examination of herbarium material has led to the recognition of *Scolopia Zeyheri* Szyszy and *S. Ecklonii* Szyszy as specifically distinct, and that *S. Gerrardii* Harv. and *S. Engleri* Gilg are varieties of *S. Ecklonii*. A very distinct species of the genus, collected at Barberton, is described as *S. Thorncroftii*.—*E. P. Phillips.*

2876. Podpěra, Jos. **Studien über den Formenkreis der Cortusa Matthioli L.** [Studies concerning the form variations of Cortusa Matthioli.] Beih. Bot. Centralbl. II Abt. **39**: 276–287. 1922.—The Brün and Prague museums and the collections of Vienna University and the Kerner herbarium furnished the material for this study. Differences in leaf form, calyx teeth, and hairiness were the basis for separation of this species into races. Seven forms with several subforms are described. *Cortusa Matthioli* belongs to the high mountains of Eurasia. It possesses great plasticity in adjusting itself to local conditions. Such differences are of great importance to the plant geographer and ecologist.—*L. Pace.*

2877. Pole Evans, I. B. **The flowering plants of South Africa 2**[5]: *Pl. 41–50* [*colored*]. 1922.—*Aloe Wickensii* Pole Evans, *Commelina benghalensis* L., *Hessea Zeyheri* Baker, *Watsonia Galpinii* L. Bolus, *Massonia latifolia* L., *Kniphofia alooides* Moench., *Heliophila scandens* Harv., *Holmskioldia speciosa* Hutchinson & Corbishley, and *Rhamphicarpa tubulosa* Benth. are described and illustrated. *Ceropegia tristis* Hutchinson is recorded as a new species from Cape Province, Natal.—*E. P. Phillips.*

2878. Pole Evans, I. B. **The flowering plants of South Africa 2**[6]: *Pl. 51–60* [*colored*]. 1922.—*Gazania subulata* R. Br., *Pelargonium crassicaule* L'Her., *Androcymbium melanthioides* Willd., *Mesembryanthemum aloides* Haw., *Aloe striata* Haw., *Polyxena haemanthoides* Baker, *Dimorphotheca spectabilis* Schltr., *Mimetes capitulata* R. Br., *Erythrina caffra* Thunb., and *Sparaxis grandiflora* Ker are described and illustrated.—*E. P. Phillips.*

2879. Pole Evans, I. B. **The flowering plants of South Africa. 2**[7]**:** *Pl. 61–70* [*colored*]. 1922.—*Corycium crispum* Sw., *Aloe excelsa* Berger, *Gladiolus alatus* var. *namaquensis* Baker, *Gazania pygmaea* Sond., *Ornithogalum Thunbergianum* Baker, *Ferraria antherosa* Ker, *Harveya squamosa* Steud., *Gladiolus Pritzelii* Diels, *Gazania Pavonia* R. Br., are described and illustrated. *Ochna pretoriensis* Phillips is proposed as a new species from Pretoria.—*E. P. Phillips.*

2880. Ponzo, A. **Considerazioni sulle Cistacee.** [**On the Cistaceae.**] Nuovo Gior. Bot. Ital. **28:** 157–173. *Fig. 1–9.* 1921.—A careful study of the group indicates that there have been several lines of development within the family. *Cistus* represents the oldest branch of the phylogenetic tree, while *Heteromeris, Lechea,* and *Hudsonia* are of more recent origin.—*Ernst Artschwager.*

2881. Schönland, S. **South African Cyperaceae.** Bot. Surv. South Africa Mem. **3:** 1–72. *Pl. 1–80.* 1922.—The greater part of the text consists of critial notes on the genera of Cyperaceae represented in the South African flora. Selected species have been chosen as illustrative of the genera concerned. These species are portrayed by full-page illustrations; their geographical distribution is indicated, and numerous exsiccatae are sighted. A table is introduced to show the relationship of the South African genera of Cyperaceae. No new species are included.—*E. P. Phillips.*

2882. Smith, W. W. **Whytockia, a new genus of Gesneraceae.** Trans. and Proc. Bot. Soc. Edinburgh, **27:** 338–339. *Pl. 7.* 1919.—*Stauranthera chiritaeflora* Oliver and var. *minor* W. W. Smith, both from Province of Yunnan, western China, are referred to the new genus **Whytockia.**—*Roxana Stinchfield Ferris.*

2883. Surgis, E. **Recherches sur les Frankéniacées.** [**Researches on the Frankeniaceae.**] Rev. Gén. Bot. **34:** 409–416, 450–462, 499–507. *Pl. 1–4, fig. 1–13.* 1922.—The Frankeniaceae, a small family of dicotyledonous plants which has been incorporated in the Caryophyllales, are halophytic plants, being found at the edge of the sea or in dry places, salt deserts in subtropical and temperate regions of 5 parts of the world. All authors who have studied the group have retained it as a family. The difficulties encountered with the genera *Hypericopsis* and *Beatsonia* resulted from the use of such variable characters as pilosity, leaves, calyx, and corolla instead of stamens and carpels, which furnish more constant characters. Five genera are recognized, *Niederleinia, Hypericopsis, Beatsonia, Anthobryum,* and *Frankenia. Hypericopsis persica* Boiss. var. *augustifolia* is described as a new variety from southern Persia; *Beatsonia compacta* as a new species from the Island of St. Helena. *Anthobryum* Philippi is transferred from the Primulaceae to the Frankeniaceae and 3 species are included under it, namely, *A. triandrum* (*Frankenia triandra* Remy), *A. tetragonum* Philippi, and *A. aretioides* Philippi. A study of the anatomy of this family completes the paper.—*J. C. Gilman.*

2884. Wolf, W. **Notes on Alabama plants.** Amer. Midland Nat. **6:** 151–158. 1919. —Critical notes on several plants are recorded, and a new species, *Talinum Mengesii,* is described from Cullman County, Alabama.—*J. M. Greenman.*

MISCELLANEOUS

B. E. Livingston, *Editor*

S. F. Trelease, *Assistant Editor*

2885. Anonymous. **Scientific problems and progress. Addresses of the presidents of the sections of the British Association.** Nature **110:** 352–356. 1922.—This article gives brief abstracts of the addresses, including that of H. H. Dixon on Transport of Organic Substances in Plants.—*O. A. Stevens.*

2886. Anonymous. **The British Association addresses of 1922.** [Rev. of: Anonymous. **The advancement of science 1922. Addresses delivered at the 90th annual meeting of the British Association for the Advancement of Science, Hull, September, 1922.** *252 p.* John Murray: London, 1922.] Nature **110:** 507–508. 1922.—This publication is in anticipation of the annual volume giving a complete record of the British Association's proceedings at the meeting. The practice of such publication is to be commended and is found to meet a public demand. The addresses, slightly abridged in some cases, have been, or are being, reproduced in Nature.—*O. A. Stevens.*

2887. Benedict, R. C. **Game laws for ferns and wild flowers.** Amer. Fern Jour. **12:** 33–45. *Pl. 2.* 1922.—The author quotes the law passed by the state of Vermont in 1921 for the protection of native wild plants. The list of the plants protected is included in the law. Many of the plants are becoming rare on account of ravages made by commercial collectors, forest fires, and utilization of the land for agriculture and quarrying. Some remedies, such as the growing of decorative species artifically and the establishing of reservations for the rare species that are in danger of becoming extinct, are suggested. Other states are urged to follow the example of Vermont.—*F. C. Anderson.*

2888. Carini, A. **Abcès de la région ombilicale dû à la pénétration à travers l'ombilic des semences de Capim (Melinis minutiflora).** [**Abscess of the umbilical region due to penetration by seeds of Capim.**] Bull. Soc. Path. Exotique **15:** 215–219. *Fig. 1–3.* 1922.—Seeds of *Melinis minutiflora* P. Beaur. and of *Capim jaragua* (*Andropogon rufus* Jacq.) are reported to have produced abscesses by penetrating the skin of the workmen handling large quantities of the seed. Reports of the trouble were rather frequent. The seeds are covered with a series of spines directed in such a way as to permit of easy entrance and difficult removal. Hygroscopic movements, as well, aid in penetration.—*G. H. Godfrey.*

2889. Conn, H. J. **Collaborators in the standardization of biological stains.** Science **56:** 594–596. 1922.

2890. Dawson, W. J. **A new method of paraffin infiltration.** Ann. Botany **36:** 377–378. 1922.—The material is transferred from absolute alcohol to a mixture of 1 part melted paraffin, 2 parts xylol, and 3 parts absolute alcohol; after 24 hours the cork is removed and evaporation allowed to proceed until only the paraffin remains. Transition from absolute alcohol to paraffin is effected in 1 step, at a uniform and sufficiently slow rate.—*W. P. Thompson.*

2891. Georgeson, C. C. **Summary of work at the stations.** Rept. Alaska Agric. Exp. Sta. **1920:** 1–12. 1922.—A general summary and review of the work done at the 5 experiment stations in Alaska is presented. This work is given in more detail in the reports of the station superintendents which follow in the same report.—*J. P. Anderson.*

2892. McWharf, J. M. **The banana as a food product.** Trans. Kansas Acad. Sci. **30:** 124–125. 1919/21 [1922].—An account is given of the utility of bananas as food, together with a comparison of the calory values of 33 foods in common use, showing bananas as 7th in rank.—*F. C. Gates.*

2893. Nyeboe, M. **Torvs Anvendelighed til Fremstilling af Elektricitet.** [**Peat for operating an electric plant.**] Tidsskr. Landokonomi 11. 497–506. 1922.—A discussion is given of the value of peat or peat moss as fuel to replace coal in the operation of an electric plant.—*Albert A. Hansen.*

2894. O'Kane, W. C. **Crop Protection Institute fellowship.** Phytopathology **12:** 156. 1922.—The Crop Protection Institute, National Research Council, Washington, D. C., announces 2 fellowships with an income of $2500 each, to promote research relative to the fungicidal and insecticidal value of sulphur.—*B. B. Higgins.*

2895. Patch, Edith M. **Marooned in a potato field.** Sci. Monthly **15:** 166–180. 1922.—An account is presented of the thoughts and dreams of a scientist while getting together the material for one of the matter-of-fact publications sent out by agricultural experiment stations.—*L. Pace.*

2896. Pearl, Raymond. **Trends of modern biology.** Science **56:** 581–592. 1922.

2897. Sayre, L. E. **Nature's use of disinfectants and antiseptics.** Trans. Kansas Acad. Sci. **30:** 388–392. 1919/21 [1922].—This is a general paper of popular interest emphasizing that legal and commercial discouragement of popular study of antiseptics in the preservation of food is inimical to progress. The author also states, however, that he has no intention of advocating unnecessary and indiscriminate use of antiseptics for the purpose mentioned.—*F. C. Gates.*

2898. Tucker, Elbert S. **Studies of insects associated with the American mistletoe.** Trans. Kansas Acad. Sci. **30:** 143–170. *Pl. 1–3.* 1919/21 [1922].—Reference is made to the occurrence of more than 60 insects found associated with the mistletoe (*Phorodendron flavescens* Nutt.). An annotated bibliography of 32 titles is appended.—*F. C. Gates.*

2899. Watson, J. R. **Correlation between sun spots and Florida freezes.** Proc. Florida State Hort. Soc. **35:** 166–169. 1922.—The earliest freeze recorded (1766) occurred during a period of high sun spot activity. Of the 6 most severe freezes recorded in Florida (a temperature of 18°F. or lower) all occurred during the periods of high sun spot activity.—*J. C. Th. Uphof.*